Feeding THE Family

Mary Swartz Rose

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Feeding THE Family

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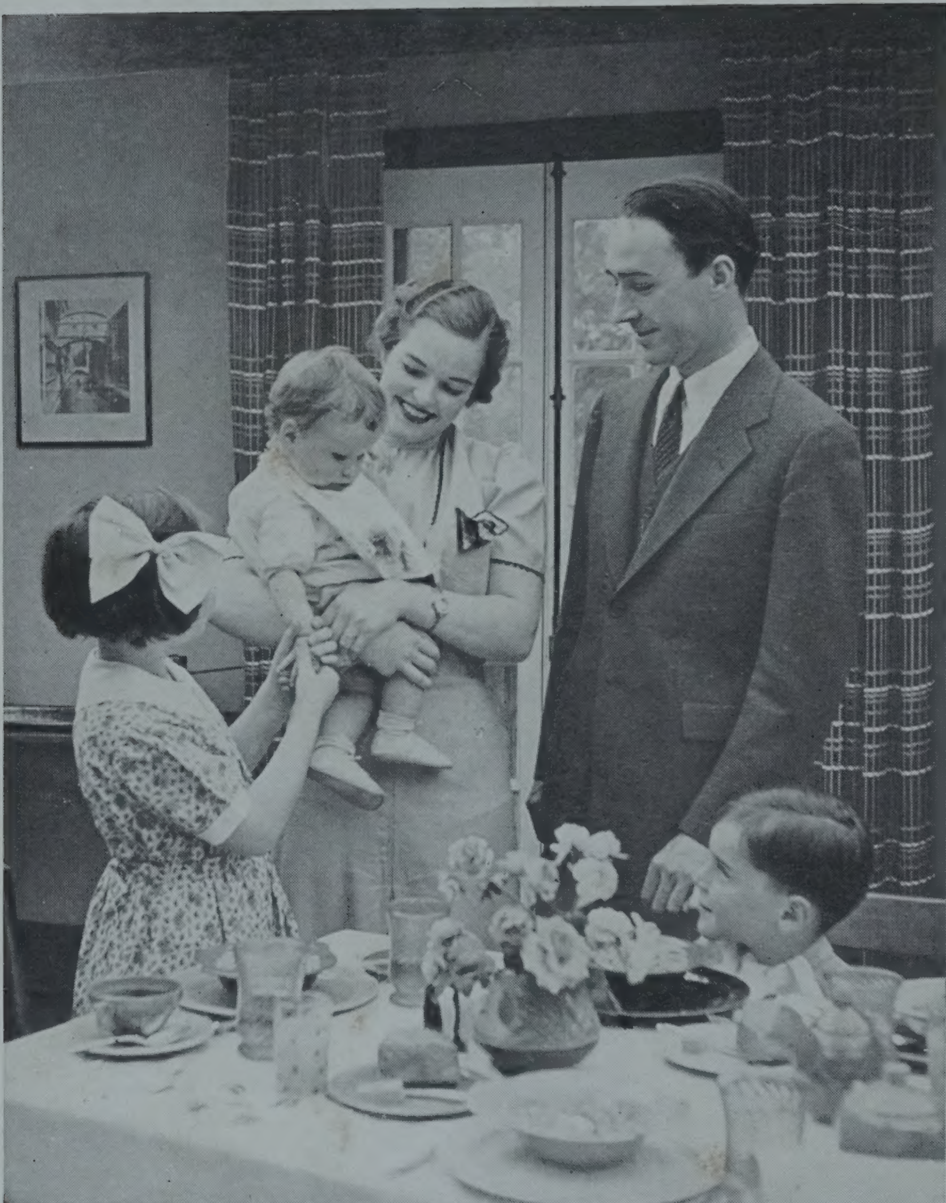

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The welfare of the family is largely in the hands of the one who provides the three meals a day.

Feeding THE Family

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PREFACE

The purpose of this book is to help those who regard their own health and that of their families as worthy of their best efforts, and who recognize that while many things contribute to health—sleep, fresh air and exercise, for instance—the most fundamental consideration is food. So many kinds of food are displayed in our markets, so many new commercial food products insist on their "vital" importance, so many placards offer advice about what to eat, that a guide book to good nutrition seems quite essential for the twentieth century family.

The general plan is to devote separate chapters to the food needs of the different members of a typical family group—fathers and mothers, grandparents, young men and women, growing children of various ages and babies—and then to consider the food problems of the family group as seen by the housewife who has the task of selecting the food, preparing the meals, and seeing to it that each one eats what is best for him. Since there are, unfortunately, emergencies of illness some time or other in most families, a chapter on feeding the sick has been included. There has been, however, no attempt to make this comprehensive or detailed, because the sick should be fed under a physician's guidance. The writer believes that the home feeding of the sick will be more successful if there is a clear understanding of the purposes of the diet and if a few suggestions about foods and menus can be referred to in the time of stress.

In the years which have elapsed since the first appearance of this book, there has been an increasing application of our knowledge of the importance of a carefully chosen diet for child development and the maintenance of vigor in the adult. This has come about through the accumulation of evidence that growth is directly influenced by food and that a diet which may be adequate for the growth of the young to normal maturity may not be entirely satisfactory for the mother during the periods in which the

child is directly dependent upon her for its nourishment. Both before and after birth mineral elements and vitamins greatly affect the development of the child and the vigor of his tissues. To a considerable degree they influence the ability of the mother to furnish milk adequate for growth during the critical first year. As a result of such knowledge we have increased emphasis upon the daily use of rich sources of vitamins A and D, such as egg yolk and cod liver oil, and of vitamins B_1 and C, such as orange juice and tomato juice or their equivalents, at all times when growth is involved. Also we have now cognizance of the fact that an adult as well as a growing child will profit by a diet which is of better quality than demanded for mere maintenance; and the hope that by more liberal use of milk and green vegetables we may improve the health and increase the resistance of all the members of the family to bacterial infections of certain sorts which, while not always leading to specific diseases, do decrease the vigor of the tissues and often pave the way for more serious troubles.

Because this book has always recommended diets of this type, no radical changes have been necessary in this edition, but every food plan and dietary has been scrutinized with a view to possible improvement without undue increase of cost. Few changes in cost have been necessary but these have been made wherever the former figures did not seem as representative as it is possible for such to be, considering the inevitable difference in market conditions in different localities.

The routine use of recognized food sources of vitamin B_1 (thiamin) and vitamin C (ascorbic acid) has been given more emphasis, and in the dietaries foods which contribute significant amounts of vitamin G (riboflavin) as well as vitamins A, B_1, and C have been indicated.

Great progress in the recognition of allergy as a dietary problem has been made in recent years and since treatment frequently involves abstention from one or more staples in the ordinary diet, such as eggs, milk, or wheat in any of its forms, it is often perplexing to know how to provide an adequate diet with such restrictions. A section on allergy has therefore been added to the chapter on Feeding the Sick.

With the spread of nutrition knowledge has come a greater demand for detailed information about the nutritive values of individual foods, and while the main purpose of this book is to show how the use of suitable proportions of common foods—milk, cereals and breadstuffs, fruits and vegetables, fats, sugars and meats—will provide all the healthy members of the family group with food for optimum nutrition, Table I in the Appendix has been remade to include data on minerals and vitamins for those who wish them.

Many of the young people who have been fed according to the suggestions made in these pages already have families of their own and it is the author's hope that this edition may serve them as the former ones have served their parents.

To the many friends in this country and abroad whose kind expressions of appreciation have been the inspiration for this fourth edition, the author wishes to express her sincere thanks, as well as to Professor Henry C. Sherman for his valuable advice and criticism, to Dr. Ella McC. Vahlteich for her assistance in the revision of the tables and dietaries in the present edition and to all those esteemed co-workers who have from time to time assisted in the preparation of the manuscript.

M. S. R.

March, 1940

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THE SIGNIFICANCE OF FOOD

Introduction

"WHAT shall we have for dinner?" This is the constant cry of the housewife, who often feels that housekeeping would be relieved of one of its greatest bugbears if some one else would undertake the planning of the meals. And yet this is a burden not so easily shifted to another's shoulders. Menus may be written, but they seldom fulfill requirements exactly as they stand. The foods designated are not in the market, or the family does not like them, or there are leftovers to be disposed of, and the problem remains unsolved. In fact, the one who is entrusted with the feeding of the family has a responsibility not lightly escaped. Of the three necessities of life which the home must provide,—food, clothing, and shelter,—food is the most important. Without it, life is impossible. With scanty provision of it, growth is stunted and power declines. With abundance, one may stuff the furnace until the fires of life are dulled by sheer surplus of good fuel. By indiscreet choice, precious days of life may be lost on account of headache or other acute, though minor, ills, and by continued bad feeding the way paved for serious impairment of health. For food most people spend the largest part of their incomes. What a pity if they buy sickness instead of health!

While it is true indeed that "the life is more than meat," it is equally true that there is no life of the spirit without sustenance for the body. The welfare of the family, both physical and spiritual, is largely in the hands of the one who provides the "three meals a day" which often seem so appalling in their inevitability. The only way of relief is through mastery of the principles which underlie the daily choice of meals. "What shall we have for

dinner?" does not imply choice between nothing and something, as under the precarious conditions of primitive life or the equally uncertain chances of extreme poverty. It indicates, rather, bewilderment amidst a wealth of materials for man's delectation such as the world has never seen before. If only half a dozen foods were available, the matter would be quickly settled. The question is apt to mean, What new foods can be found to delight the palate or charm the eye of those who are never really hungry? Eating is a social custom as well as a physiological necessity, and the hostess, even at a table of two, is disturbed, votes her dinner a failure and her efforts wasted if her partner does not partake freely. What she may really need is more skill in divining his physiological requirements, rather than in preparing dainty dishes to pamper his appetite.

Many traditions have grown up about foods, rooted in ancient tribal or religious taboos, or the result of misinterpreted experiences. There are people to-day who solemnly affirm that fish and milk are a dangerous combination, based on who knows what unhappy coincidence! If an unusual food has been eaten at the same time as an onset of acute illness, the food often gets the blame, though the evidence is wholly circumstantial. The coincidence of the brain and fish both having rather high percentages of phosphorus has at least given us the pungent advice addressed to the young man who wanted some quantitative dietetic instruction as to the amount of fish needed to develop his brain—"Eat a whale!"

In the light of modern scientific research these traditions and false impressions give way to exact knowledge of what food does for the body and how it does it. By patient steps, through Lavoisier's brilliant insight into the relation between the intake of oxygen in respiration, the output of carbon dioxide from the lungs, and the evolution of heat and work in the body; Liebig's study of the composition of foods and body materials; Rubner's accurate researches establishing definite relationship between food consumption and body activity; Eijkmann's demonstration that a specific disease may be produced by one diet and cured by another; Hopkins's brilliant conception of subtle elements in food

regulating nutritional processes; Osborne and Mendel's control of growth through changes in the quality of a single chemical component of the dietary; McCollum's finding that old age may be deferred through a well-assorted diet; and Sherman's demonstration that a good diet can be made better by simple changes in natural foods, as shown by more rapid development of the young and greater vigor and a longer "prime of life" in adults—through the work of these and other able investigators, we have come to the realization that nutrition is science rather than a bundle of old wives' rules; that foods, though so numerous and so varied in form, can be reduced to rather simple terms; that the amount required by a man for a day's work can be determined with amazing accuracy, and that even the factors which govern the power to develop can be analyzed and a young animal made to grow or be stunted at will by the control of its food.

Scientists in many laboratories are studying the laws which govern nutrition, and as they progress in knowledge the housewife is given new standards by which to choose the food for the family, and greatly increased power to secure physical welfare for the group in her care. She is also relieved of old and foolish fears about the baleful influence of this or that particular food, and turns a deaf ear to alarmists and faddists, who by juggling with technical terms often bring good foods into disrepute. Meals of many kinds are found to be good, and simplicity may be cultivated without fear of dietary deficiency when one knows the A, B, C of good nutrition.

The Body a Working Machine

In considering the part which food plays in human life, one of the most important conceptions which modern science has given us is that of the body as a working machine, whose output we can measure as accurately as that of any steam, gasoline, or electric engine. Unlike other machines, this living one must work to exist. Man is to be compared to a clock, going all the time, rather than to an automobile engine, working only at intervals. When one is lying asleep or perfectly quiet, the heart goes on with its work, which, counted for a whole day, will amount to as much as lifting

an average man some 2500 feet into the air; the chest moves in respiration; the muscles are under tension ready for any sudden call to further work; the digestive tract is busy caring for the last meal, or if that is gone, possibly by vigorous movement calling like Oliver Twist for "more." Every movement, voluntary or involuntary, even to winking an eye, is work in the mechanical sense; and exercise which brings many muscles into play, whether in digging a ditch or playing football, sweeping a room or flitting over a tennis court, adds to the energy expended in proportion to its severity.

Fuel for the Human Machine

In order to have energy to spend as outlined above, we must first acquire it. But how? The earth's great bank of energy is the sun; its currency is light and heat. These man cannot "cash in" directly. They have to go through a great clearing house, the plant world, before they become available for the human economy. Plant cells transmute light and heat into chemical energy and bind this with elements from the air and soil to make three great classes of energy-bearing substances, which man can use for his activities, known as *protein*, *fat*, and *carbohydrate*. These are the "fuels" which supply energy for the human machine. This energy of food may be converted into useful work—inside the body in keeping up the life processes, outside in performing all sorts of muscular movement—and also into heat to maintain body temperature. In fact, heat is a by-product of all bodily activities, which is turned to good account in keeping warm. If not enough is obtainable in this way, the transformation of more energy into heat can be brought about by doing more work (shivering, clapping the hands, stamping about, running, etc.); or if this is not done, by the automatic response of internal processes to the stimulus of cold, increasing somewhat the rate at which body fuel is burned. Since the three fuel foodstuffs are so essential to man's well-being, it behooves us to inquire how they may be obtained.

Sources of Body Fuel

The three kinds of material which serve as body fuel, *protein*, *fat*, and *carbohydrate*, are found variously distributed in all sorts

of vegetable food. From the juice of the beet and sugar cane we refine a pure carbohydrate, *sugar*, which is also found in the juice of sweet fruits and vegetables, such as oranges, grapes, apples, corn, peas, etc. From wheat, oats, corn, and other grains, potato tubers, manioc roots (tapioca), we secure another form of pure carbohydrate, *starch*, which is also found in lesser amounts in many kinds of fruit and vegetables, as bananas, peas, beans, nuts (especially chestnuts).

From olives, cottonseed, peanuts, cocoa beans, and other seeds we can obtain pure fat, which we find plentiful in nuts, but only in small amounts in other kinds of vegetable food.

The vegetable foods which have the largest amounts of protein are the legumes,—peas, beans, lentils, and peanuts. Nuts such as almonds, filberts, walnuts, pecans, have also a considerable store. Next in importance come the cereals, with oats, wheat, and corn heading the list. Other vegetable foods contribute comparatively small amounts of this sort of fuel.

Plant foods may be called the original source of human energy. But animals, eating the plants, may work over the protein, fat, and carbohydrate of their plant food in their internal laboratories, the living cells, and produce animal proteins from the vegetable proteins, animal fat from the vegetable carbohydrate or fat, and animal carbohydrates from any one of these three, but especially from the carbohydrates. These new forms, elaborated in the animal body, also serve man for fuel. In animal food as he eats it there is little carbohydrate, except in milk, though scallops, oysters, and clams are perhaps worthy of mention. Fat is found more or less intimately associated with lean in all kinds of meat, about the leanest animal food being codfish. Milk is often prized most for its fat, in the form of cream or butter, and bacon also offers fat in a very acceptable form.

Strictly lean meat affords fuel in the form of protein, whatever the animal from which it is derived. From bones we get gelatin, also pure protein, though not in all respects equivalent to that of meat. Milk and eggs are particularly valuable for their protein content. Cheese consists chiefly of the protein from milk, with or without the fat, according to variety. Egg white has all its fuel

in the form of protein, while the yolk has it partly as protein and partly as fat.[1]

Measurement of the Fuel Value of Food

Food materials differ greatly in the amount of protein, fat, and carbohydrate which they may contain. Some, as has been noted, have only one kind of fuel, some two, and some all three, and these in varying proportions. It is, nevertheless, a comparatively simple matter to find out how much energy (or working power) a given kind of food is capable of yielding in the body. The chemical processes by which energy is liberated are of the same nature as burning outside the body. If we take some kind of food, then, as a lump of sugar, and burn it under such conditions as to make the process complete and to measure all the heat generated, we can express this heat in terms of a standard unit of measurement, called the calorie. A special piece of apparatus is used in food laboratories which fulfills all the requirements for measuring the fuel value of food; it is called a calorimeter. The food is burned in an atmosphere of pure oxygen in a gas-tight chamber or "bomb," and the heat is taken up in water surrounding the bomb, the change in temperature of the water showing the amount of heat liberated.

In reckoning the fuel value of food, we have to consider whether it will be burned as completely in the body as in the calorimeter and one of the tasks of the nutrition laboratories has been to discover the losses due to incomplete utilization of food materials. From hundreds of digestion experiments we have learned how to correct the calorimeter returns for the healthy person on a mixed diet and can say in general that an ounce of pure carbohydrate or pure protein will yield 113 calories to the body; an ounce of fat, 255 calories.

But, as we have seen, most of our foods are mixtures of these substances in varying proportions, and almost always we find associated with the energy-yielding substances water, mineral

[1] For further information on the kind and relative amounts of protein, fat, and carbohydrate in different food materials, the reader is referred to Table II of the Appendix, to Sherman's *Food Products*, Rose's *Laboratory Handbook for Dietetics*, or to *Proximate Composition of American Food Materials*, U. S. Dept. of Agriculture Circular 549.

matter and vitamins, very valuable in the diet for other reasons, but not sources of energy; also plant fiber or cellulose, a form of carbohydrate which the body cannot use for fuel but which makes valuable ballast for the digestive tract. We may say, then, that the more water and cellulose a given food contains the lower its fuel value for a given weight will be. Thus the fuel value of pure sugar is 1814 calories per pound; that of grape juice, which as regards fuel is practically a dilute solution of sugar, is only 454 calories per pound; while that of tomatoes, composed largely of water and cellulose, is but 103 calories per pound. Pure proteins and carbohydrates have the same fuel value per pound in the body, but pure fat has two and one-fourth times as high an energy value per pound; hence the more fat a food contains, the higher its energy value in proportion to its weight.

Some differences in fuel values of various foods, when compared by weight, are brought out in the following tables, in which the foods are grouped according to the fuel foodstuff which predominates in them:

I. Foods Rich in Protein

	Calories per Pound of Edible Uncooked Material
Beef, dried, lean	817
Beef, fresh, lean	709
Beef, tongue, fresh	718
Cheese, cottage	498
Cod, fresh, steaks	357
Cod, salt	473
Egg whites	231

II. Foods Rich in Fat

	Calories per Pound of Edible Uncooked Material
Bacon	2836
Butter	3488
Cream, thick	1728
Lard	4082
Oleomargarine	3410
Olive oil or cottonseed oil	4082
Salt pork	3555
Suet	3425
Walnuts, English	3199

III. Foods Rich in Carbohydrate

	Calories per Pound of Edible Uncooked Material
Apples	285
Bananas	447
Cornstarch	1632
Dates	1575
Honey	1480
Molasses	1301
Potatoes, white	378
Rice	1591
Sugar, granulated	1814
Tapioca	1608

IV. Foods Rich in Both Protein and Fat

	Calories per Pound of Edible Uncooked Material
Almonds	2936
Beef, fat	1357
Cheese, American	1996
Eggs	672
Egg yolks	1643
Milk, whole	314
Peanut butter	2741
Peanuts	2487
Sardines	1221

V. Foods Rich in Protein and Carbohydrate

	Calories per Pound of Edible Uncooked Material
Beans, dried	1564
Bread	1174
Buttermilk	159
Farina	1641
Lentils	1581
Macaroni	1624
Milk, skim	166
Oatmeal	1803
Oysters	229
Peas, dried	1612

VI. Foods Rich in Cellulose and Water

	Calories per Pound of Edible Uncooked Material
Cabbage	143
Celery	92
Cucumbers	62
Lettuce	79
Spinach	108
Squash (winter)	198
Tomatoes	93
Watermelon	137

From such tables it is easy to see that we could scarcely depend upon celery or lettuce for our daily fuel supply, as it would be hard to eat even a single pound in one day and a man would require over 25 pounds. It is also evident that some foods are cheaper fuel than others, bread at 10 cents a pound being nearly 12 times as cheap fuel as oysters at 25 cents a pound. In everyday life, however, we do not eat foods by the pound, but by the *serving*. When we sit down to the table and the host serves the meat, we should like to be able to tell how many calories he is passing us. When the dessert comes in, we should need mental agility, indeed, to translate pounds of eggs, flour, sugar, and cream into ice cream and cake. A better unit for this purpose is the amount of food required to yield 100 calories, which corresponds quite closely to the ordinary serving of a number of foods. The following table shows how convenient a unit this is for practical purposes.[1]

Approximate Amounts of Food to Yield 100 Calories

Cooked or flaked breakfast foods	¾–1¼ cups
Milk	⅝ cup, whole; 1⅛ cups, skim
Cream	¼ cup, thin; 1⅔ tablespoons, very thick
Butter, olive oil, or other fat	1 tablespoon
Bread	1 slice 3 in. × 3½ in. × 1 in.
Uneeda biscuit	4 crackers
Fresh fruit	1 large orange or apple; 1 medium banana or large bunch of grapes; 2 medium peaches or pears
Dried fruit	4 or 5 prunes; 3 or 4 dates; 2 dozen raisins; 1½ large fig

[1] For fuller details see Table I of the Appendix.

Approximate Amounts of Food to Yield 100 Calories—*Continued*

Eggs	1 exceptionally large; 1⅓ medium
Meat (beef, lamb, mutton, veal, chicken)	About 2 ounces of cooked lean meat
Bacon (cooked crisp)	About ½ ounce (4 small thin slices)
Potatoes	1 medium
Sugar	2 tablespoons granulated; 3½ "full-size" lumps
Cocoa (made with milk)	⅖ cup
Cream of bean soup	½ cup
Macaroni and cheese	½ cup
Rice pudding	½ cup
Ice cream (made with thin cream)	¼ cup
Milk sherbet	¼ cup
Sponge cake	1¾ in. cube
Nuts (shelled almonds, peanuts, pecans)	About ½ ounce
Sweet chocolate	About ¾ ounce

Measurement of the Fuel Requirements of the Body

Food is fuel for the human machine, but how shall we know how much to supply? Ordinarily we trust to appetite, and an unperverted appetite is a very useful guide to rational eating. If an adult year in and year out maintains a uniform normal weight, we may assume that his food supply is adjusted to his needs. If a child makes healthy, steady gains in weight throughout the period of growth, a study of the food which he consumes will give us a good clue as to his actual needs. But all adults do not maintain normal weight; some are too thin and many are too fat; all children do not make normal gains in weight; appetite is too great or too little or too pampered, and we need accurate measurement by scientific methods of the real fuel needs of the body to serve as a check on appetite or as a guide when appetite fails. Before it was realized that the energy in food must be proportioned to the body's energy expenditure, it was the custom to feed invalids very largely on beef tea and other broths with little fuel value. No matter how quietly they lay in bed, the internal work of their bodies had to go on, which means that fuel was still being burned; only in this case little of it came from food, and most of it from stores of fat held in the body for just such emergencies, and some of it from the proteins of the body itself, such as the proteins of muscle. Now it is clearly understood that a man lying quietly in

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Measuring the energy cost of work.

bed throughout the twenty-four hours of the day uses at least twelve calories for every pound of body weight, which means for an average man a daily total of from 1600 to 1800 calories. So far as conditions permit, care is taken to see that the energy supply comes from food, rather than that the body be permitted to burn itself up. A general starving policy for the sick is as obsolete as blood-letting.

The first satisfactory way to study any person's fuel requirements was to measure directly the amount of energy given off from his body hour by hour in the forms of work and heat. To do this, a closed chamber with walls impervious to heat is required, and means of supplying fresh air and food, so that the person may remain within for some time. Such an apparatus, called a respiration calorimeter, is used in certain large nutrition laboratories, but nowadays simpler devices are available which measure the energy output indirectly, through determination of the amount of oxygen consumed or of carbon dioxide given off by the lungs. The illustration opposite shows one way of measuring the oxygen consumed. The rubber bags in the investigator's hands contain known amounts of oxygen, which is transferred to the receptacle on the worker's back as needed. He breathes through the mouthpiece connected with the oxygen container by rubber tubing. A clip on his nose prevents his getting any outside air. In the circuit is an absorber for carbon dioxide, so that the conditions for respiration are always satisfactory. After a certain amount of time, the oxygen used will serve as a means of determining the body fuel consumed during the working period.

The energy expenditures of men, women, and children have been studied in much detail, and no matter what preconceived notions a person may have had about his own food requirements, the calorimeter or respiration apparatus measures his actual energy expenditure, which there is no way to meet except by food. Hundreds of observations show that men under the same conditions of age, weight, and occupation expend practically the same amount of energy. This is further verified by studies of food consumed by men of the same class doing the same kind of work

in different parts of the world, as the table below strikingly illustrates.[1]

Farmers in Connecticut	3410 Calories
Farmers in Vermont	3635 Calories
Farmers in New York	3785 Calories
Farmers in Mexico	3435 Calories
Farmers in Italy	3565 Calories
Farmers in Finland	3474 Calories
Average	3551 Calories

As far as energy requirement is concerned nutrition is an exact science; a definite amount of work calls for a definite amount of energy in the form of food. The only reason why we are not forced to stop working as soon as food is withheld is that we are able to carry stores of fat (and a little carbohydrate) as reserve fuel, and also to draw if necessary on our own body protein. So men have fasted thirty and forty days; but the body becomes more and more impoverished, and when the reserves are exhausted there must come fuel in the form of food or all work stops and death is the result. On the other hand, if more fuel is supplied than can be used, the fires do not burn the brighter but the surplus is stored up for emergencies and we say the person is getting fat. In later chapters the fuel requirements of the different members of the family will be discussed in detail.

The Body a Builder of Its Own Substance

The body is not only an active, working machine, spending energy in the form of work and heat, and demanding that the expenditure be made good by fresh supplies of fuel in the form of food; it is also a busy contractor, sending goods hither and yon along a network of traffic lines, to add to parts already built, or to replace or repair parts lost through ordinary wear and tear or through accident. The materials handled are of various kinds, made up from 17 or 18 different elements, among which may be mentioned carbon, hydrogen, oxygen, nitrogen, sulfur, phosphorus, iron, calcium, magnesium, potassium, sodium, chlorine, and iodine. By means of these substances a seven-pound baby grows until he becomes a man weighing perhaps 200 pounds; and

[1] Lusk, Graham, *Fundamental Basis of Nutrition.* Yale University Press (1923).

the man, though daily losing small portions as the price of his very existence, may still maintain a uniform weight through many years of adult life, by taking in enough to replace what has been lost. The relative amounts of these different elements in the adult body are shown in the following table:

Approximate Composition of the Adult Human Body[1]

Oxygen	65.0	per cent
Carbon	18.0	per cent
Hydrogen	10.0	per cent
Nitrogen	3.0	per cent
Calcium	2.0	per cent
Phosphorus	1.1	per cent
Potassium	0.35	per cent
Sulfur	0.25	per cent
Sodium	0.15	per cent
Chlorine	0.15	per cent
Magnesium	0.05	per cent
Iron	0.004	per cent
Manganese	0.0003	per cent
Copper	0.00015	per cent
Iodine	0.00004	per cent
Cobalt	Very minute quantities	
Zinc		
Silicon		
Aluminum		
Fluorine		
Perhaps others		

[1] Sherman, H. C., *Chemistry of Food and Nutrition*, 5th Edition, page 242. The Macmillan Company (1937).

How Food Supplies the Material for Body Building

The fuel foods all contain carbon, hydrogen, and oxygen, so that no special attention need be paid to these elements. Protein food has an absolute monopoly of the nitrogen supply for the body, and so occupies a distinguished place in the human economy, for nitrogen enters into the construction of body proteins, which are essential to the life of every cell and constitute the most prominent part of muscle tissue. A child cannot grow and form strong muscles without it; a full-grown adult cannot keep in health without it, for throughout life the cells discard small amounts of nitrogen hour by hour, as a waste product of their internal life; furthermore, some old cells die, are disintegrated and their nitrogen thrown out, so that altogether there is a certain

daily loss which must be made good by protein food. Hence, in choosing the day's fuel we cannot confine ourselves to carbohydrate and fat, but must include some protein. The proportion of fuel best taken in this form will be discussed in connection with the food requirements of the different individuals in the family group.

Protein is a term standing for a large number of related substances, all made by the chemical union of simpler substances containing nitrogen, called *amino acids*. There are at least 23 of these entering into the structure of common proteins, and, as has been aptly suggested, these are used like the letters of the alphabet to build up different kinds of protein. It is estimated that 20 of these units may be joined together to make 2,432,902,008,176,640,000 different combinations. Hence we have milk, meat, fish, egg, cereal, and vegetable proteins, all built from the same "building stones," or the same "letters of the protein alphabet," containing therefore all the essentials for constructing different kinds of body protein, as circumstances may require. Such proteins are called "complete." There are certain proteins, such as gelatin and some kinds found in vegetable foods, in which important amino acids are lacking. If these "incomplete" proteins were used as the sole kind of protein in the diet of children they could not grow, because some of the constituents for building body protein would be lacking. It would be like taking the word *legume* apart and trying to make the word *muscle*. We should have a superfluous *g* and *e*, but no *s* nor *c*, and be forced to break up another word, such as *casein*, to get the extra letters. The effect of incomplete proteins has been most interestingly shown in the feeding of young rats. When given milk food or a mixed diet they grew up in the normal way, but on a diet in which the only protein food was a single kind of incomplete protein, called gliadin, separated for the purpose from all the other proteins of the wheat kernel, they seemed perfectly well but could not grow; as long as they were kept on the gliadin diet they remained dwarfs, but as soon as fed with the milk food or mixed diet they began to grow again. In one classic experiment a rat fed the gliadin diet weighed, when 140 days old, just what it should have weighed when 36 days old!

Fortunately, most protein foods contain a goodly assortment of amino acids, and on an ordinary mixed diet, in which milk, eggs, meat, fish, and various vegetables rich in protein are used, an adult need have little concern as to the particular kind of protein which he is taking. If he confines himself to vegetable food, in which incomplete proteins are more frequent, there is more danger of lack of sufficient amounts of some amino acid, and the combination with such a diet of some milk, cheese, or other food known to be rich in "complete" proteins is wise. In the diet of growing children this is a matter of more importance, and emphasis must be laid on the *best* proteins for growth, as will be brought out in the chapters on feeding of children.

The total amount of protein in the food is measured according

Amounts of Protein in 100-Calorie Portions of Some Common Food Materials

Food Material	Measure of Portion	Protein Calories	Protein Grams	Nitrogen Grams
Gelatin, dry	3 tablespoons	100	24.9	3.98
Cod, fresh steaks	5 ounces (uncooked)	94	23.4	3.90
Chicken, lean meat	3 ounces (cooked)	80	19.9	3.19
Halibut, steaks	3 ounces (uncooked)	61	15.3	2.45
Beef, lean round	2¼ ounces (uncooked)	55	13.6	2.18
Oysters, solids	⅔ cup	49	12.3	1.95
Salmon, canned	½ cup	45	11.1	1.78
Buttermilk	1⅛ cups	41	10.2	1.62
Milk, skim	1⅛ cups	37	9.3	1.49
Eggs	1⅓ eggs	36	9.1	1.47
Sausage, Frankfort	1 sausage	31	7.8	1.25
Peas, dried	2 tablespoons (uncooked)	28	6.9	1.10
Beans, navy	⅛ cup (uncooked)	26	6.5	1.04
Cheese, American	1⅛-inch cube	26	6.5	1.04
Beans, baked (canned)	⅓ cup	22	5.4	0.86
Milk, whole	⅝ cup	19	4.8	0.77
Peanuts, shelled	2 dozen singles	19	4.7	0.75
Oatmeal	¾ cup (cooked)	17	4.2	0.67
Macaroni	¾ cup (cooked)	15	3.7	0.59
Bread, white	2 small slices	14	3.6	0.58
Almonds, shelled	12-15 nuts	13	3.2	0.51
Wheat, flaked	⅔ cup (cooked)	13	3.2	0.51
Cornmeal	⅔ cup (cooked)	10	2.6	0.42
Walnuts, shelled	8-16 meats	10	2.6	0.42
Chocolate, bitter	½ square	8	2.1	0.33

to its weight, usually in grams;[1] according to its fuel value, in calories; or according to the amount of nitrogen which it yields. The table at the bottom of the preceding page shows these protein and nitrogen values for a number of foods rich in protein.

Sulfur needed for the building of body proteins is found mostly in two closely related amino acids, cysteine and cystine and a third known as methionine. These sulfur-bearing amino acids are not evenly distributed in all proteins. Some have little or none and some have a great deal. Often one protein present in a food will have but little and another in the same food will be rich in sulfur. This is the case with milk. One of its proteins (casein) has very little; another (lactalbumin) has a great deal. The result is

AMOUNTS OF PHOSPHORUS IN 100-CALORIE PORTIONS OF SOME COMMON FOOD MATERIALS

FOOD MATERIAL	MEASURE OF PORTION	PHOSPHORUS GRAMS
Buttermilk	1⅛ cups	0.277
Haddock	5 ounces	0.276
Cheese, cottage	5 tablespoons	0.240
Codfish, fresh	5 ounces (uncooked)	0.238
Celery	4 cups of ¼-inch pieces	0.237
Lettuce	2 large heads	0.235
Cauliflower	½ medium head	0.197
Spinach	2½ cups (cooked)	0.192
Egg yolk	2 yolks	0.163
Eggs	1⅓ eggs	0.151
Asparagus	20 stalks	0.149
Tomatoes	2 cups (cooked)	0.138
Turnips	2 cups of ½-inch cubes	0.136
Milk	⅝ cup	0.135
Beans, dried	⅛ cup (uncooked)	0.134
Beef, lean	2¼ ounces (uncooked)	0.130
String beans	2¼ cups of 1-inch pieces	0.123
Cabbage	5 cups (shredded)	0.108
Corn, green	½ cup	0.100
Rhubarb	4 cups of 1-inch pieces	0.100
Oatmeal	1 cup (cooked)	0.098
Onions	3-4 medium	0.096
Peas, dried	2 tablespoons (uncooked)	0.075
Peanuts	2 dozen singles	0.072
Potatoes	1 medium	0.064
Bread, whole wheat	2 slices ¼-inch thick	0.062

[1] There are 453.6 grams in one pound, and 28.35 grams in one ounce.

that milk will supply enough sulfur for growth. In the main, if the diet is diversified the various proteins will yield the body sufficient sulfur when its nitrogen requirement is met.

Phosphorus is equally important with nitrogen, though required in smaller amounts. It forms a part of every active cell of the body and, along with calcium, helps to give rigidity to the bones and teeth. It is not limited like nitrogen and sulphur to the protein of food, but is found sometimes associated with protein, as in the protein of the yolks of eggs (called vitellin), or one of the proteins of milk (casein); sometimes associated with fat, as in the yolks of eggs (in the lecithin); and sometimes in simpler forms in grains, fruits, and vegetables.

Iron is another element essential to body structure. It enters into the composition of the red corpuscles of the blood (essential to the conveyance of oxygen to the cells and hence to the burning

Amounts of Iron in 100-Calorie Portions of Some Common Food Materials

Food Material	Measure of Portion	Iron Grams
Spinach	2½ cups (cooked)	0.0107
Celery	4 cups of ¼-inch pieces	0.0031
Beans, dried	⅛ cup (uncooked)	0.0029
Beans, string	2⅓ cups of 1-inch pieces	0.0028
Egg yolk	2 yolks	0.0024
Tomatoes	2 cups (cooked)	0.0022
Eggs	1⅓ eggs	0.0020
Beef, lean	2¼ ounces (uncooked)	0.0019
Beets	2-4 medium	0.0019
Strawberries	1⅓ cups	0.0017
Turnips	2 cups of ½-inch cubes	0.0015
Peas, dried	2 tablespoons (uncooked)	0.0015
Cabbage	5 cups (shredded)	0.0014
Carrots	3-4 medium	0.0014
Oatmeal	¾ cup (cooked)	0.0012
Potatoes	1 medium	0.0011
Onions	3-4 medium	0.0010
Prunes	4-5 medium	0.0010
Figs	1½ large	0.0009
Raisins	¼ cup	0.0009
Bread, whole wheat	2 slices ¼-inch thick	0.0007
Milk	⅝ cup	0.0004
Bread, white	2 slices ¼-inch thick	0.0004

of the fuel foods) and also is an element in the structure of all active cells, so playing a part in secretion and growth. While not needed in very large amounts, it is so important that the new-born child is not left to the chances of getting it in his food, but comes into the world with a special supply to tide him over the first few months, while he is becoming adjusted to the outer world. It is found in a variety of foods, among the most valuable being egg yolk, liver, and green vegetables, especially spinach. Bread and cereals from whole grains also add materially to the iron content of the diet.

Calcium is essential for strong bones and teeth. In combination with phosphorus it is the chief mineral element of these tissues. By far the most valuable source of calcium is milk, 100 calories

Amounts of Calcium in 100-Calorie Portions of Some Common Food Materials

Food Material	Measure of Portion	Calcium Grams
Collards	1⅔ cups, steamed	0.413
Celery	4 cups of ¼-inch pieces	0.390
Buttermilk	1⅛ cups	0.299
Cheese, American	1⅛-inch cube	0.211
Milk, whole	⅝ cup	0.171
Cabbage	5 cups (shredded)	0.143
Beans, string	2¼ cups of 1-inch pieces	0.133
Carrots	3-4 medium	0.102
Onions	3-4 medium	0.084
Asparagus	20 stalks 8 inches long	0.080
Beets	2-4 medium	0.061
Figs	1½ large	0.061
Tomatoes	2 cups (cooked)	0.048
Beans, dried	⅛ cup (uncooked)	0.043
Eggs	1⅓ eggs	0.042
Peas, fresh	¾ cup	0.023
Bread, whole wheat	2 slices ¼-inch thick	0.020
Prunes	4-5 medium	0.019
Raisins	¼ cup	0.017
Oatmeal	¾ cup (cooked)	0.017
Potatoes	1 medium	0.014
Bread, white	2 slices ¼-inch thick	0.010
Beef, lean	2¼ ounces (uncooked)	0.008
Cracker, soda	4 crackers	0.005
Cornmeal	⅔ cup (cooked)	0.005

of milk yielding as much as can be obtained from about 2400 calories of meat or of white bread made without yeast food.[1] Considerable calcium can be obtained from the grains if the outer coats are included, but very little from cereal preparations made without them, as a comparison of whole wheat and white flour will show. Vegetables, though less striking a source of calcium than milk, yield enough to be of some importance, except spinach, whose calcium is not absorbed by human beings. Milk should be the chief reliance for calcium all through the period of growth.

The other elements which go to make up the body structure are not only required in comparatively small amounts, but are almost sure to be provided if the diet contains the range of foods which will insure the four already mentioned.

Balance Wheels for the Human Machine

A man with locomotor ataxia is a pitable sight. He can move about, but he has lost the power to control his movements at will. He makes us realize what fine coordination of nerves and muscles ordinary people enjoy. Now the body is composed of many units, each with activities of its own, but subservient to the welfare of the whole; there are glands, like the pancreas and the thyroid, which play a wonderful part in this coordination. If the pancreas becomes seriously deranged, the body loses the power to burn carbohydrate, and this most valuable of fuel foods is lost to the economy; if the thyroid gets excessively active, the body may burn fuel faster than it can be supplied, and the victim grows emaciated.

The Minerals

The chemical elements which make up the body substance must be present in suitable amounts or trouble ensues. The blood maintains its neutrality, the heart its regular beat, nerves and muscles their ready response to every impulse, largely through the presence of phosphorus, calcium, magnesium, sodium, and potassium in suitable amounts in the tissues and fluids. These and all the other chemical elements in the body except carbon,

[1] For calcium in white bread with and without yeast food see Table I of the Appendix.

hydrogen, oxygen, and nitrogen are grouped together under the term ash constituents, because they constitute the part left behind as ash when food materials are burned or are more commonly known as *mineral elements*. When any one of these minerals is withheld or is insufficient in amount a young animal's growth is interfered with. Moreover, the efficiency of each element is enhanced by proper amounts of the others.

As in the case of the Three Musketeers it is "each for all and all for each"—none functions at its best except as part of a well-balanced diet. Iron builds good red blood efficiently only when a trace of copper is present too. Phosphorus and calcium, both essential to sound teeth and strong bones, can be utilized only when they are brought into proper relationship to each other. Rickets, that disease of early childhood characterized by failure of the bones to deposit calcium phosphate properly, may be produced experimentally in animals by diets low in phosphorus but high in calcium, and vice versa. Were it not for a special vitamin (see vitamin D in the section following) which enables the body to use these two substances in varying proportions, we should have to pay special attention to the balance between them. Even with this vitamin present good supplies of both are necessary.

In goitrous regions there is a shortage of iodine in water and food. This substance is essential to the normal functioning of the thyroid gland. When the iodine supply is deficient the gland tends to enlarge, simple goiter being the result. The ocean is the source of iodine, and consequently goiter is of rare occurrence near the seacoast. But in various parts of the world there are great inland areas where it is prevalent. In the United States, for example, the Great Lakes region and portions of the Northwest are distinctly goitrous. Very little iodine is contained in ordinary foods, rich supplies being found only in sea foods, in sea salt which has not been highly purified, and in drinking water which has its origin near the ocean or has derived iodine from the soil through which it passes. Fruits and vegetables vary in their iodine content according to the soil in which they grow. Where the drinking water has little iodine, the foods grown in the dis-

trict are not likely to be rich in it. The only completely non-goitrous country in the world appears to be Japan, whose people constantly consume large amounts of seaweed.

Goiter tends to develop in prenatal life, at adolescence, especially in girls, and in women during pregnancy. More than twenty years of experience have now shown that its eradication depends upon a steady supply of iodine to the whole population and that this is best achieved by the general use of iodized table salt. Michigan has been one of the foremost states in initiating and sustaining a goiter prevention program and in studying the results. About twelve years ago, after four years of distribution of iodized salt (one part of sodium iodide in 5000 parts of salt) and an educational program to encourage its use, a survey was made to determine the incidence of goiter among school children, and in 1935 a resurvey was made, which showed that the consumption of iodized salt had become general. In 1924 the largest salt distributor in Michigan reported that 45,079 cases of plain table salt had been shipped in that year to the state whereas in 1930 there were shipped only 7,057 cases of plain table salt and 58,643 cases of iodized salt. The practically complete eradication of simple endemic goiter is indicated by the statistics from Detroit, among whose children it was reduced from 35 per cent in 1924 to slightly over one per cent in 1932. This confirms the statement of Dr. Marine,[1] who initiated the studies of goiter prevention in Michigan, that goiter is "the simplest, the easiest and the cheapest of all known diseases to prevent." It also illustrates how important a very minute quantity of a single mineral element can be in the health of human beings.

Water

Water helps to regulate the concentration of the mineral elements, to make possible the transportation of materials to the tissues by holding them in solution in the body fluids, and to facilitate the removal of waste through the kidney drainage system. It also plays an important rôle in the regulation of body

[1] Marine, D. "The Physiology and Principal Interrelations of the Thyroid." *Journal of the American Medical Association*, Vol. 104, page 2250 (1935).

temperature. A liberal daily supply is essential to the best health and should be regularly provided for in the scheme of living of every person young or old. Four to six glasses a day in addition to what is obtained in food is usually sufficient.

The Vitamins

Besides the energy-bearing materials, water and minerals, there are substances existing in minute quantities in foods which exercise a profound influence upon nutrition. These are known as vitamins. For a long time these eluded the food chemist because of the exceedingly small amounts present in ordinary quantities of food. They were missed in the ordinary analysis, partly for this reason, and partly because some of them very easily change their form and lose their identity when subjected to the usual manipulations of the chemical laboratory. Hence it was through observations of the effects of various dietary restrictions upon men and animals that we came to realize that vitamins are indispensable to good nutrition, and to study our foods in order to know where to find each one. Just as the great physicist measures invisible atoms and studies the arrangement of the still more minute ions which compose them, so the chemist, without seeing a vitamin with the naked eye or even a microscope, has found means to measure the amount of any vitamin in any food. For the most part he is still dependent upon the use of carefully standardized laboratory animals for his measurements and the work proceeds slowly. But no less than eight vitamins have been crystallized and their chemical composition made known. Some of these are now manufactured much more cheaply than they can be obtained from natural sources.

Discovery of the vitamins began with the ushering in of the twentieth century, although the name was not coined until 1911. Knowledge of one of them led to the search for others, and in fairly rapid succession half a dozen were discovered and, pending their chemical identification, designated by different letters of the alphabet. Now these whose chemical structure is known are given names indicative of their character. Since designation by

letter is more familiar at the present time, letters will be given preference in this book.[1]

Vitamin A

Vitamin A is essential to growth, reproduction, and lactation, and the maintenance of bodily vigor at every stage of existence. On a diet containing every dietary essential except this one vitamin, a young albino rat (the standard animal for testing for vitamin A) will soon show a decline in the rate of growth, finally cease to grow at all, and develop many symptoms of physical unfitness, such as rough and falling hair, running nose and ears, chalky, brittle teeth and, in the course of time a characteristic eye disease known as xerophthalmia.

If at this stage we add to the diet some food containing vitamin A, the eye disease will promptly clear up, the nasal or ear congestion will abate, the hair will cease to fall out and gradually become glossy again, and growth will be resumed.

Striking as is the influence of vitamin A upon the growing animal, its effects on the reproductive capacity of the adult are equally impressive. Two pairs of well-fed adult animals, one pair on a diet devoid of vitamin A, the other on a diet containing it, will not show any bad effect of the diet for a long time, because reserves of this vitamin may be stored in the body, and tide over periods of temporary shortage. But the pair deprived of the vitamin A will have very few, if any, offspring, and what few they may have will be weak if not still-born. The mother will be unable to suckle the young properly, and that family will die out unless the young are put upon a better diet.

Young animals placed at weaning on a diet with a low supply of vitamin A may be able to grow to full adult size if they have received a good store from their mother before birth and during the nursing period, but they will not be of full vigor, as is shown by delayed maturity and earlier onset of senility; they are prone to succumb to lung infection in early adult life, at a period when young men and women most frequently develop tuberculosis.

[1] For a brief discussion of the discovery of the vitamins consult Rose's *Foundations of Nutrition*, 3rd Edition, Chapters X-XV, The Macmillan Co. (1938), Harris's *Vitamins in Theory and Practice*, 2nd Edition, Cambridge University Press (1938).

Young animals deprived for a time of the vitamin and then given a full supply again are frequently more susceptible to infection in various organs and tissues than other animals which have had a full supply throughout their whole period of growth.

If instead of a diet completely lacking in vitamin A one with a small amount of the vitamin is given, the animals will live longer but will develop a disease of the nervous system, manifested first by paralysis of the hind legs and great muscular weakness which become progressively worse until death ensues. But long before any other signs of vitamin A deficiency appear, there may be inability to see clearly in a dim light, a condition known as night blindness. The visual purple of the retina is always bleached by bright light but recovers quickly when the eye is well supplied with vitamin A. In night blindness it recovers slowly. A rat with night blindness exposed to a bright light and then required to leap across a hole in a dimly lighted place will be unable to see where the landing is, while a normal rat will make the leap with perfect ease.

That vitamin A is widespread in its influence in the body receives further emphasis from recent discoveries of its relationship to the health of the teeth. When rats are placed on a diet lacking vitamin A their teeth become chalky, owing to loss of the enamel, and as they grow become more and more misshapen, since the same organ that controls the health of the enamel also affects other actively functioning parts of the tooth.

Many of these effects on animals have been amply confirmed for human beings. As early as 1904, a Japanese physician, Dr. Mori, reported cases of eye disease in children living largely on rice cured by adding to their diet chicken livers, which we now know to be very rich in vitamin A. Some years later a large number of cases were observed among poor children in Copenhagen, who, under war conditions, were having only skim milk in addition to a diet consisting mostly of cereals. These children were cured by substituting whole milk, the cream carrying the vitamin A which the diet otherwise lacked. At the present time in China, India, Ceylon, Java, Sumatra and the Malay States, lack of vitamin A is the chief cause of preventable blindness in

FOODS FURNISHING APPROXIMATELY THE SAME AMOUNT OF VITAMIN A

Food Material	*Weight (oz.)*	*Measure*
Lettuce	14.3	1 large head
String beans	1.9	17 beans
Milk	8.5	1 cup
Bananas	11.3	2 medium
Carrots	0.6*	½ very small
Peas	1.8	⅜ cup
Tomato	2.3	1 small
Butter	0.5	1″ cube
Spinach	0.1	1 small leaf
Egg yolk	0.5	1 yolk

*Exclusive of stem and leaves.

children. In this country although severe shortage of vitamin is uncommon, many do not get as much as they need. Dr. Jeans of the State University of Iowa has shown that many Iowa school children, when tested for night blindness, gave evidence of this condition and upon administration of cod liver oil or some other very rich source of vitamin A were soon restored to normal dark adaptation. The more rapid the rate of growth and the greater the size, the more vitamin A is needed. Experiments in various laboratories show that at least four times as much vitamin A as is necessary to secure normal growth can be profitably used in promoting general vigor.

The most dependable way of measuring the vitamin A values of foods is by tests with albino rats. Young animals newly weaned from mothers on a standard diet are kept on a vitamin A-free ration until growth ceases, and are then fed small amounts of the

VITAMIN A IN 100-CALORIE PORTIONS OF FOODS

FOOD MATERIAL	MEASURE OF PORTION	INTERNATIONAL UNITS OF VITAMIN A
Apples, fresh	1 large	89
Bananas	1 medium	179
Beans, string	2⅓ cups of 1-inch pieces	1808
Beets, fresh	4 beets, 2-inch diam.	29
Butter	1 tablespoon	384
Cabbage	3½ cups (chopped)	142
Carrots, fresh	1⅔ cups of ½-inch cubes	5138
Cauliflower	1 small head, 4½-inch diam.	123
Cheese, American	1⅛-inch cube	431
Collards	1 cup (cooked)	6885
Eggs, whole	1⅓ eggs	1005
Egg yolk	2 yolks	752
Grapes, fresh	1 large bunch	24
Lettuce, bleached	2 large heads	536
Milk, whole	⅝ cup	227
Orange juice	¾ cup	96
Peas, green	¾ cup	750
Peppers, green	5 peppers, 3½ inches long	2076
Potatoes, sweet	½ medium	1562
Potatoes, white	1 medium	26
Rutabagas	1⅔ cups of ½-inch cubes	36
Spinach, fresh	2⅓ cups	46408
Tomatoes	2 cups, scant	2858
Turnip greens	1⅔ cups (cooked)	14250

material to be tested, their gains in weight over a period of not less than four weeks being observed and compared with gains of other animals similarly treated that have been fed a known amount of the vitamin. In order to bring the findings of many laboratories all over the world to a common basis, an International Committee on Vitamin Standardization in 1934 established as an international unit a definite weight of the substance in plants from which the animal body makes vitamin A, called carotene. One unit is 0.6 microgram of carotene, and if a group of test animals fed an international unit of carotene and a group fed a certain amount of a food make the same average gain in weight over a four week period, it is concluded that the food contains the equivalent of one international unit of vitamin A. In the preceding table are given the vitamin A values of a number of common foods.

Vitamin B_1 or Thiamin

Vitamin B_1, like vitamin A, is essential for growth, reproduction, and lactation. Its withdrawal from the diet has a speedy and pronounced effect upon appetite and digestion, so that food is generally refused, and if eaten, remains in the digestive tract to make trouble instead of being absorbed and used by the body. Both rats and pigeons very quickly manifest a characteristic disease of the nervous system known as polyneuritis or beri-beri when this vitamin is withheld from the diet. The body becomes distorted, the gait uncertain, and paralysis finally causes death unless the vitamin is supplied. If given in time, improvement is almost immediate and return to normal condition occurs within a day or so. Partial deprivation may not result in acute disease but in a low state of health with poor appetite, poor digestion, nervousness, and other more or less vague symptoms, from all of which recovery is prompt when the lacking vitamin is supplied.

The young growing creature suffers from lack of vitamin B_1 very quickly since little can be held in reserve in the tissues. The higher the rate of growth and the greater the energy requirement, the more vitamin B_1 is needed. Vitamin B_1 enters into combination with phosphorus to make a substance which

Foods Furnishing Approximately the Same Amount of Vitamin B_1 (Thiamin)

Food Material	*Weight (oz.)*	*Measure*
Sweet potato	3.2	½ medium
Cauliflower, steamed	4.2	⅓ small head
Apple	7.5	1 large
Wheat germ, flaked	0.15	1 tbsp.
Pork chop	0.9*	½ chop
Whole wheat bread	1.1	1 very thin slice
Peas, steamed	1.6	⅓ cup
Tomato	5.0	1 small
Egg yolk	1.0	1⅔ yolks

*Weight of meat only

is indispensable for the burning of carbohydrate food. This is at least one reason why the person with the higher energy expenditure needs more vitamin B_1; almost invariably more carbohydrate will be burned as activity increases. The nervous disturbance occurring with shortage of vitamin B_1 is due to the accumulation of partly burned carbohydrate in the body. As soon as vitamin B_1 is given, the combustion goes on normally and the nerve symptoms subside.

Observations on experimental animals have in recent years been amply confirmed for human beings, and the dangerous tendency of the American diet to be low in this dietary factor has been recognized. The routine use of liberal amounts of vitamin

VITAMIN B_1 (THIAMIN) IN 100-CALORIE PORTIONS OF FOODS

FOOD MATERIAL	MEASURE OF PORTION	INTERNATIONAL UNITS OF VITAMIN B_1	MICROGRAMS OF VITAMIN B_1
Apples, fresh	1 large	20	60
Bananas	1 medium	15	45
Beans, string, fresh	2⅓ cups of 1-inch pieces	40	120
Cabbage	3½ cups (chopped)	80	240
Cantaloupe	1 melon, 5-inch diam.	37	110
Carrots, fresh	1⅔ cups of ½-inch cubes	56	168
Collards	1 cup (cooked)	102	306
Eggs, whole	1⅓ eggs	20	60
Egg yolk	2 yolks	25	75
Flour, whole wheat	4½ tablespoons	22	65
Grapes, fresh	1 large bunch	13	39
Lettuce	2 large heads	109	327
Milk, whole	⅝ cup	16	48
Muskmelon	1 melon, 5-inch diam.	37	110
Oats, rolled	½ to ¾ cup	18	54
Onions	3-4 medium	10	30
Orange juice	¾ cup	73	219
Peas, green	¾ cup	150	450
Peppers, green	5 peppers, 3½ inches long	21	63
Potato, white	1 medium	24	72
Prunes, dried	4 medium	13	39
Rutabagas	1⅔ cups of ½-inch cubes	37	101
Spinach, fresh	2½ cups	162	486
Tomatoes	2 cups, scant	85	255
Turnip greens	1⅔ cups (cooked)	81	243
Turnips, fresh	2½ cups of ½-inch cubes	43	129
Wheat, shredded	1 biscuit	14	42

B_1 is important not only for the best health and growth of the young but also for adults, as a means of enhancing and preserving the efficiency of the alimentary tract and of the nervous system. More is required for pregnancy than for growth and still more for lactation. A generous intake will do no harm; a shortage is sure to be a serious disadvantage.

Vitamin B_1 is measured by the use of suitably standardized animals, either determining their rate of growth when material to be tested is added to a vitamin B_1-free ration, or by noting the time required to cure induced polyneuritis. Now that pure thiamin is available, the International Committee on Vitamin Standardization has defined an international unit as 3 micrograms (0.000003 gram) of the pure substance. Many of the vitamin B_1 values of foods which are current at the present time have been made by feeding tests in which the amount of the food which would induce a gain of 3 grams per week for from 4 to 6 weeks in a suitably prepared albino rat was called a Sherman-Chase unit. An approximation of these values in international units may be made on the basis of one international unit equalling two Sherman-Chase units. In the preceding table are given vitamin B_1 values of some 100-calorie portions of foods in terms of international units and also of pure thiamin.

Vitamin C or Ascorbic Acid

In the absence of vitamin C a very characteristic disease develops, namely, scurvy. This is a disorder affecting many parts of the body. The ribs may exhibit beading similar to that in rickets, while hemorrhages into the skin, the intestines, and the muscles commonly develop. In extreme cases, the teeth may become loosened in their sockets. Anemia and pains in the joints are sometimes attributed to other causes, when in reality due to scurvy. In the young, growth is affected, though not so markedly as when vitamin A or B_1 is withheld.

More common in this country than acute scurvy is a low state of health from a partially inadequate supply of vitamin C. One of the marked effects is fragility of the walls of the blood vessels, especially the capillaries. Another is degenerative changes in cells

Foods Furnishing Approximately the Same Amount of Vitamin C (Ascorbic Acid)

Food Material	*Weight (oz.)*	*Measure*
Pineapple juice	7.5	1 cup (scant)
Banana	7.3	1 large
Orange juice	1.6	¼ cup (scant)
Tomato juice	3.3	1 cup
Apples	11.2	2 medium
Grapefruit	1.6*	3 small sections
Potatoes	10.0**	2 large
Peas	3.0	⅔ cup
Cucumbers	4.7	⅓ cucumber 10″ long
Cabbage	1.9	Small serving

*Weight of edible portion only. **Value for cooked potatoes.

within the teeth known as odontoblasts which interfere with their health and normal development. Furthermore the bones, lacking adequate vitamin C, are not able to hold their calcium and become porous and brittle and fracture easily. Vague symptoms of ill health, such as a sallow, muddy complexion, a feeling of lassitude, and fleeting pains in joints and limbs, often mistaken for rheumatism, occur frequently among those living habitually on a diet very low in vitamin C. In a study of the boys in Christ's Hospital, a famous old school near London, extending over many years, it was found in 1918-22 that one of the results of dietary restrictions during the world war was the increased number of fractured bones, and many complaints of rheumatism, which decreased as soon as the diet was improved, largely due to the increase in milk (unpasteurized), fruits and vegetables.

The mother needs a plentiful supply in her diet before the baby

Vitamin C (Ascorbic Acid) in 100-Calorie Portions of Foods

Food Material	Measure of Portion	International Units of Vitamin C	Milligrams of Vitamin C
Apples, fresh	1 large	160	8
Bananas	1 medium	170	9
Beans, string, fresh	2⅓ cups of 1-inch pieces (cooked)	220	11
Beets, fresh	4 beets, 2-inch diam. (cooked)	140	7
Cabbage	3½ cups (chopped, uncooked)	1750	88
Carrots, fresh	1⅔ cups of ½-inch cubes (uncooked)	140	7
Collards	1 cup (cooked)	930	47
Corn, green	½ cup (canned)	100	5
Grapefruit	½ medium	1380	69
Lemon juice	1⅛ cups	1670	84
Milk, whole	⅝ cup (unheated)	40	2
Onions, fresh	3-4 medium (raw)	310	16
Orange juice	¾ cup	1190	60
Pears, fresh	2 medium	110	6
Peas, green	¾ cup (uncooked)	400	20
Peppers, green	5 peppers, 3½ inches long (uncooked)	6900	345
Potatoes, white	1 medium (boiled)	130	7
Spinach, fresh	2½ cups (uncooked)	3700	185
Strawberries, fresh	1½ cups (raw or cooked)	1280	64
Tomatoes	2 cups (raw or cooked)	1700	85
Turnip greens	1⅔ cups (cooked)	660	33

is born to insure the best tooth development and after birth the baby should very soon receive a special vitamin C supplement even when being nursed by his own mother, since milk at best is not very rich in this vitamin. Since it is not stored in the body to any considerable degree generous daily supplies are needed to maintain the best health.

Tests of the vitamin C values of foods were at first made exclusively by use of the guinea pig, which is very sensitive to lack of the vitamin and quickly develops scurvy. Now that the chemical nature of the vitamin is known, chemical tests have been developed and found satisfactory for certain foods, but it is still necessary to check these tests on new foods with the results of feeding experiments with the guinea pigs to be sure that there are no discrepancies between the two types of test.

The International Committee on Vitamin Standardization has defined one unit of vitamin C as 0.05 milligram of pure ascorbic acid. One guinea pig unit, known as the Sherman-La Mer unit, is equivalent to 10 international units or 0.5 milligram. The amounts of vitamin C in some 100-calorie portions of common foods are given in the preceding table in international units and in milligrams of ascorbic acid.

Vitamin D

Vitamin D is essential for the proper development of the bones and teeth and the prevention of rickets. It is also necessary for normal growth. In the absence of vitamin D it is difficult for the bones to secure from the blood stream the calcium and phosphorus necessary for calcification. Bow legs are often noticed, but more serious are the misshapen jaws, contracted thorax and pelvis which are not as easily outgrown. Rachitic children are especially susceptible to decaying and protruding teeth and, what is even more serious a menace to health, to bronchitis, pneumonia and other disturbances of the respiratory tract.

We are independent of food in regard to this vitamin so long as we have plenty of sunshine. It is formed in the body by the action of the ultraviolet rays of sunlight upon the skin. Hence in sunny climates rickets is a disease which seldom occurs, and in

temperate climates it is more prevalent in winter than in summer. We can imitate nature by means of a lamp emitting a large proportion of ultraviolet rays (the quartz mercury vapor lamp) and increase thus the amount of vitamin D in our bodies. Few common foods contain vitamin D in appreciable amounts and none in quantities sufficient to be adequate protection against rickets. With the discovery of vitamin D in cod liver oil, a new era in the history of rickets began in the temperate zone, characterized by the daily use of this prophylactic in the diets of infants and growing children. It is also possible to obtain concentrates of vitamin D from fish liver oils free from the oil and also to produce vitamin D by the irradiation with ultraviolet light of a substance obtained from yeast called ergosterol. The activated ergosterol is marketed in oil under the name of viosterol. We also have today vitamin D milk, to which the vitamin has been added by direct irradiation, by the use of concentrates derived from fish liver oils, or by the feeding of irradiated yeast to the cow. It is generally advisable for young children to have cod liver oil even when vitamin D milk is used because of their great need of vitamin D and also for the vitamin A which it also furnishes. All fish liver oils contain both vitamins, but in varying proportions. Halibut liver oil, which is richer in vitamin A than vitamin D, is often preferred by adults because a day's allowance can be put into a small capsule. This is satisfactory because their requirement for vitamin D is not as high as that of children. Growing children accept cod liver oil readily and its routine use in their diet is splendid health insurance.

Vitamin G or Riboflavin

Vitamin G is a yellow pigment with a green fluorescence which was known to be present in milk fully half a century before any one suspected that it might be a vitamin. It gives to whey its yellow-greenish tinge. In 1933 it was isolated from milk whey and egg white in pure crystalline form, 0.06 gram of crystals being obtained from about 750 gallons of milk. Now it is being manufactured commercially and used routinely in experimental rations in nutrition laboratories as one of the essentials of an adequate diet, necessary for growth and for health at all ages. Albino rats de-

prived of this vitamin manifest a partial failure of appetite, but enough food is eaten to keep them at a stationary weight for some weeks, during which they take on the appearance of very aged animals. The hair becomes rough and falls out in patches, especially around the head and shoulders, the mouth becomes sore and the legs and tail stiff. If the rats live for 60 to 80 days, they are likely to develop cataracts on their eyes. These symptoms, accompanied by digestive disturbances, nervous weakness and increased susceptibility to infection, are rapidly cured and the animals are restored to their normal youthful appearance when vitamin G is administered.

Vitamin G (riboflavin) combines with phosphorus and protein to form a substance essential to all living cells and tissues, and the appearance of premature old age is probably largely due to the

Vitamin G (Riboflavin) in 100-Calorie Portions of Foods

Food Material	Measure of Portion	Bourquin-Sherman Units of Vitamin G	Micrograms of Vitamin G
Apples, fresh	1 large	32	96
Bananas	1 medium	30	90
Beans, Lima, fresh	½ cup	81	243
Beans, string, fresh	2⅓ cups of 1-inch pieces	60	180
Beef, round, lean	Slice 2¾ inches x 1½ inches x ¾ inch	64	192
Beets, fresh	4 beets, 2-inch diam.	109	327
Cabbage	3½ cups (chopped)	159	477
Carrots, fresh	1⅔ cups of ½-inch cubes	111	333
Cauliflower	1 small head, 4½ inch diam.	197	591
Cheese, American	1⅛-inch cube	46	138
Eggs	1⅓ eggs	97	291
Escarole	21 leaves	459	1377
Kale	2⅛ cups (cooked)	392	1176
Lettuce	2 large heads	143	429
Liver	Slice 3½ inches x 2½ inches x ½ inch	694	2082
Milk	⅝ cup	46	138
Peas, green	¾ cup	100	300
Prunes	4 medium	87	261
Spinach	2½ cups (chopped, cooked)	418	1254
Tomatoes	2 cups	97	291
Turnips	2 cups ½-inch cubes	114	342
Veal, leg, lean	Slice 2 inches x 2¾ inches x ⅛ inch	123	369

Foods Furnishing Approximately the Same Amount of Vitamin G (Riboflavin)

Food Material	*Weight (oz.)*	*Measure*
Broccoli	2.5	5 florets
Milk	11.1	1⅓ cups
Turnip greens, steamed	1.2	¼ cup
Peas	3.6	¾ cup
Peanuts	1.8	⅜ cup
Cheese, American	1.8	Piece, 1″ x 1½″ x 2″
Eggs, whole	2.4	1⅓ eggs
Lean beef	3.4	Slice, 2¾″ x 1½″ x 1″
Yeast, bakers' compressed	0.3	⅗ cake
Liver	0.4	Slice, 1″ x 1″ x ½″

fact that without liberal supplies of this vitamin every cell must work at a disadvantage. It has been found that as the amount of vitamin G is increased the evidences of greater health and vigor become more and more marked up to about four times as much as is needed to prevent any specific sign of deficiency. This vitamin is well styled the one which "preserves the characteristics of youth."

Measurements of the vitamin G values of foods have been made by finding the amount of the substance on which suitably prepared young rats gain an average of 3 grams per week for a period of 4 or 5 weeks. This amount is known as a Bourquin-Sherman unit. The vitamin G values of some common foods are given in the preceding table. The amount of riboflavin has been estimated on the basis of one Bourquin-Sherman unit being equivalent to 3 micrograms.

Nicotinic Acid, The Pellagra-Preventive Vitamin

For 22 years, dating from 1915 when pellagra was definitely shown to be a dietary deficiency disease to 1937 when nicotinic acid was found to be the effective substance in pellagra preventive foods, various discoveries in the field of nutrition led the way to the conquest of this scourge of our Southern states and of many parts of Europe where the people live upon a very restricted diet. The spectacular cures of men and women emaciated, bed-ridden, uninterested in food, often demented, with sore mouths and tongues swollen and fiery red, dramatically demonstrate the great potency of this vitamin. With nicotinic acid it is possible to accomplish in a few days what formerly took weeks with hospital care and very special dietary treatment. It should be noted however, that the eradication of pellagra from any district is to be accomplished by the general improvement of the dietary of the people, and not merely by the administration of nicotinic acid, for the pellagrin is quite likely to be suffering from inadequacy of vitamins B_1 and G and perhaps others, as well as of protein, calcium and iron. The essential points in the dietary treatment of mild cases are liberal calories (4000 to 4500 daily) to bring the emaciated person up to normal weight, at least one

quart of milk, and from 30 to 300 grams of dried yeast, plus lean meats, liver and other foods rich in nicotinic acid. Among fresh vegetables collards, turnip greens, kale, peas and tomatoes have been found distinctly valuable, but cabbage, carrots, onions, lettuce and potatoes have little pellagra-preventive value.

The full significance of nicotinic acid in normal nutrition is just beginning to be understood. A closely related substance, nicotinic acid amide, has been found to be an important constituent of all living cells.

Vitamin B_6

When the diet on which Dr. Goldberger produced pellagra in man was fed to rats, they likewise developed skin disturbances and other symptoms which caused their deficiency disease to be called rat pellagra. But later, it was found that maize, which lacks the factor preventive of human pellagra, was a cure for the so-called rat pellagra. Such experience led to the search for another vitamin, and in 1938 pure vitamin B_6 was crystallized from rice bran and its chemical nature promptly determined. Rats on a diet adequate except for this one vitamin cease to grow after some weeks and develop sore mouths and red, swollen and bleeding ears, noses, paws and tails. A few micrograms of vitamin B_6 causes an immediate growth response, with complete healing of the dermatitis in a week or two.

The value of this vitamin in human nutrition is just beginning to be studied. A few persons who have been treated for the dietary deficiencies common in pellagra with nicotinic acid, vitamin B_1 and vitamin G, without any improvement in their usual inadequate diets, remained very miserable until they were also given vitamin B_6. Then the change was dramatic. Within 24 hours they were relieved of weakness, nervousness, irritability, and difficulty in walking. These observations indicate that vitamin B_6 is important in human nutrition.

Vitamin K, The Antihemorrhagic Vitamin

Nicotinic acid was known for 75 years before any one discovered its relationship to pellagra. Similarly, a relatively simple sub-

stance prepared synthetically in 1922 was found in 1939 to have significance in chick nutrition, as a factor in the normal clotting of the blood. When it is absent from the diet severe hemorrhages develop, resembling somewhat those of scurvy. For example, chicks fed rice, yeast concentrate and fish meal were normal, but if the fish meal were first deprived of its fat, their blood could stand for hours without clotting. Now the administration of a few micrograms of the pure vitamin brings recovery of normal clotting time in a few days.

The use of vitamin K in controlling hemorrhage in human beings suffering from an obstruction of the bile duct has been attended with striking success. It has also been used as a means of controlling hemorrhage in certain newborn infants, the clotting time of whose blood is abnormally slow.

Vitamin K is present in egg yolk and in green leaves, kale, cabbage and spinach being rich sources. There is very little in roots, seeds or tubers.

Vitamin E

Even a clothes moth needs vitamins, and one of the interesting problems of the present time is to discover just what vitamins different species require. The albino rat has proven to be surprisingly like human beings in its vitamin requirements, yet it has the advantage of being able to manufacture its own vitamin C, which mankind cannot do. On the other hand, it has been found that the rat needs a special vitamin to prevent male animals from becoming infertile, and females from losing their young after they are well developed but still unborn. This is vitamin E, which has been found to exist in three closely related chemical forms called tocopherols.

Failure to make normal gains in weight and a peculiar type of paralysis—a dragging of the hind legs—affect young rats born of mothers on a diet low in vitamin E. But if the mother is given food rich in the vitamin immediately after the birth of the young it will be transferred through her milk and the young will be protected from paralysis.

Although vitamin E may be needed by other species, evidence of

its indispensability is conclusive at present only in case of rats and dogs. Some reports of the prevention of spontaneous abortion in women by use of large doses of wheat germ oil, which is rich in this vitamin, suggest the possibility of its being a factor in this disease, but definite proof of its specific value is difficult to obtain. As Dr. Mattill, one of the foremost investigators in this field, says: "Until this is at hand, attempts to produce a market for wheat germ oil among prospective parents generally are to be deprecated; so also is the suggested threat of national dietary sterility, in view of the widespread distribution of vitamin E in the foods belonging in a well balanced diet."[1]

It occurs in all sorts of foods. The oils from wheat, corn and rice germ are rich sources and leafy vegetables also contain considerable amounts. Butter, lard and cod liver oil contain little or none, but the hardened vegetable fats sold as shortening are good sources. It is not likely that the ordinary mixed diet is deficient in this vitamin.

Another species known to need vitamin E is the chicken. The eggs of hens on rations without it do not produce live chicks because the blood vessels of the developing embryo deteriorate and it dies of starvation. But diets adequate for rats are not equally good for chicks. The rat needs comparatively little vitamin D, the chick a very large amount. The discovery of this fact has made it possible in northern climates to raise to maturity baby chicks hatched in December, which used to die from "leg weakness" due to rickets. The inclusion of cod liver oil and more calcium and phosphorus in the ration entirely eradicated this difficulty. But another form of leg weakness persisted—a kind of paralysis—which was cured by a vitamin not needed by the rat known as vitamin B_4, which is found in liver and in smaller amounts in yeast. Several other chick diseases have been shown to be due to dietary deficiencies and the investigation of the specific causes is leading to the isolation and identification of other vitamins.

These illustrations will suffice to show that the field of vitamin study is a very large one, and much work must be done before we

[1] Mattill, H. A. "Vitamin E," *The Vitamins, A Symposium, American Medical Association*, Chapter 30 (1939).

shall know how many vitamins which we find to be needed by other species are significant in human life. In the meantime we can apply intelligently our knowledge of the vitamins whose importance in human nutrition has been demonstrated and for the rest take comfort as Dr. Sherman has pointed out, in the fact "that if we plan our dietaries to meet all our known nutritional needs and meet these by the use of reasonably natural foods, these, as nature's wholes of the kinds to which our own bodies have been adjusting themselves throughout our evolutionary history, will almost certainly furnish us any substances which may be essential to our nutritional well-being though still scientifically unknown to us."[1]

[1] Sherman, H. C., *Food and Health*, pp. 159–160, The Macmillan Co. (1934).

Chapter II

THE CARE OF THE DIGESTIVE MECHANISM

The largest daily requirement for good nutrition is an adequate supply of fuel for all body activities. This must be selected in such a way as to include those substances which serve to build up the organism and keep it functioning well, constituting a so-called "balanced diet." Many selections of food will theoretically accomplish these results, but not all of them are equally successful in practice. It is possible to make a balanced ration from two or three foods, if carefully selected, and eat these to the exclusion of all others. One may take the whole day's supply of protein in the form of cottage cheese, or of beans; may divide the total day's food in two meals or six; serve molasses on meat, as truly a combination of carbohydrate and protein as bread and meat. But we must ask what practices represent the highest art in caring for the human machine. It makes a great deal of difference in an engine whether the coal for the day is put in all at once or at intervals, whether in large lumps or fine dust. We may lose valuable fuel through imperfect combustion if the fires are choked. Coal may fall through the grate and be lost with the ashes if not of suitable size. The walls of the fire chamber may be burned out by bad packing which prevents circulation of air. So in the case of the human furnace a great deal depends upon the way in which the fuel is introduced.

We gather food materials from the four quarters of the globe, prepare them in factory and kitchen for the table, and yet when the products come to the table they are mostly crude material so far as the body is concerned. The first safeguard of digestion is a diet in which all dietary essentials are present in favorable amounts. Shortage of any vitamin is likely to impair somewhat

the efficiency of digestion and absorption, and inadequacy of vitamin B_1 (thiamin) in particular is sure to depress the appetite and to cause sluggishness of the muscles of the alimentary tract, with poor digestion and constipation. The marked improvement in digestion of persons of all ages from infancy up, under dietary regimes which provide vitamin B_1 liberally is one of the achievements of modern nutrition. Nevertheless food must be subjected to many processes in that long and tortuous tract which we call the alimentary canal before it can enter upon its real functions in the living cells where energy is liberated and new material built. And the way it behaves in that canal is of great import for good nutrition. If it irritates the sensitive walls of stomach or intestines, the whole body is depressed, and the cells may be unable to make use of good material when finally brought to them. If it is crowded along too fast, with no time allowed between meals for rest of the digestive organs, a strike may be inaugurated against such bad working conditions and the poor body left to starve in the midst of plenty.

Before discussing in detail, therefore, the food needs of the family group and of individual members of the family, it will be worth while to give some attention to those principles in the choice and manner of taking food which in general tend to conserve or promote good digestion and are more or less applicable to all. The final purposes in digestion are (1) to bring all foods into fluid form, (2) to separate all proteins into their amino acid fragments, (3) to divide all fats into two components (fatty acids and glycerol), soluble in the digestive fluids, and (4) to divide all carbohydrates into their component parts (simple sugars). In such simplified forms these fuel foods pass into the blood stream and thence to the tissues.

The processes by which these objects are attained are partly mechanical and partly chemical. They begin when food is taken into the mouth and continue in orderly fashion until the products indicated above pass through the intestinal walls into the blood and lymph, and the waste material is eliminated in the feces.

The Part of the Mouth in Good Digestion

On guard at the beginning of the alimentary tract stands the mouth, whose first duty is to grind up coarse foods and soften or possibly dissolve them. Fluid foods relieve the mouth of this duty and are therefore selected when the teeth are missing or when for some other reason chewing is not likely to be well done. Fine mincing will to a large extent accomplish the same purpose; so beef is sometimes scraped free of all tough fibers, or vegetables and hard-cooked eggs put through a fine sieve when great ease of digestion is desired. On the other hand, when chewing is possible, similar fineness and softness may be attained by giving foods which *must* be chewed in order to swallow them, such as crisp toast, zwieback, and hard crackers, which tend to break up in fine pieces and are not only softened but actually dissolved by the saliva, which has the power of acting chemically upon carbohydrate material. The agents in the alimentary tract which split up proteins, fats, and carbohydrates into the fragments which can pass through the intestinal walls (amino acids, fatty acids and glycerol, and simple sugars) are technically called enzymes. They have been likened to keys, each fitting a single kind of lock, and setting free a simpler substance, as if one had a nest of boxes and a key to each by which the next smaller could be released. Thus in the saliva of the mouth we find an enzyme called ptyalin. It will unlock a starch unit, producing what we may call a "double sugar"[1] (maltose); this in turn must be unlocked by another enzyme which will set free from it a simple sugar,—the kind which the blood can take to the muscles to burn for fuel. By means of nicely adjusted series of enzymes the body is kept from being overwhelmed with the kind of material which it is trying to use. If we take at one time a large quantity of glucose, especially when the stomach contains no food which might help to dilute it, we are liable to irritation of the stomach and possibly of the small intestines, although glucose is a simple sugar and requires only to pass into the blood to be available to the body. This trouble is simply due to the fact that the body has too much of it to take care of at once. If it is greatly diluted with water

[1] Technically known as a disaccharid.

before taking, it will cause no trouble; or if taken in small enough quantities to be diluted by the saliva, or mixed with other foods so that it is thoroughly diluted by them. This is illustrated by the eating of hard and soft candy. If the hard candy is sucked it becomes greatly diluted by the saliva, while the soft candy, quickly swallowed, is diluted but little. When starch is taken, it is gradually changed to sugar, and this is one great reason why it is better to have most of our carbohydrate food in the form of starch rather than of sugar. But starch needs to be cooked so that the enzymes can readily attack it and large masses of starchy food broken up so that the digestive juices can reach every particle. Foods which become pasty in the mouth, such as hot breads of many kinds, soggy potatoes, or unripe, raw bananas, tend to slip down the throat in lumpy masses little affected by the saliva and hard for the other juices to penetrate. This is another reason why baked potatoes, baked bananas, and hard, dry breadstuffs are better for steady diet than the pasty foods just mentioned. Pure starches, like cornstarch and tapioca, may be cooked rather quickly, but cereal foods, such as oats, corn, and wheat, have their starch grains sealed within pockets of cellulose, which the body enzymes cannot soften and which are only with the greatest effort finely ground by chewing. Hence these are commercially treated to make them more digestible. Oats are crushed into very thin flakes (rolled oats) which may also be thoroughly steamed or toasted in the factory. Wheat is flaked or ground into light or dark granules (farina) which can be cooked thoroughly in a comparatively short time. Corn is made into cornmeal, which still requires long cooking to soften thoroughly, or is cooked and rolled into flakes which are toasted ready to eat when they reach the household. By such commercial treatment, the long time formerly required for cooking cereals in the home to render them easy to digest has been greatly reduced, to the convenience of the housewife, whose main care nowadays is to see that they are prepared for the table in such a way as to make them most palatable.

Besides helping to grind and soften all hard, coarse food and to digest starch, chewing is one of the signals to the stomach to prepare for its duty. The alimentary canal is operated like a com-

plex railway system. Signals are sent ahead and the way prepared for the oncoming load. Hence, while we cannot add to or take away from the energy which a food may contain by the care with which we chew it, we can make it easier for the rest of the digestive work to be carried on smoothly. We may thus save ourselves from some of the dangers of "indigestion," which often seems to be the chief topic when people discuss their food.

The Part of the Stomach in Good Digestion

The stomach is the great reservoir into which food from the mouth quietly settles. The receiving end holds it in such a way that the gastric juice penetrates it slowly; and the digestion of starchy food, begun in the mouth if the food has been thoroughly chewed and mixed with saliva, may continue here for some time, till contact with the acid gastric juice stops the action of the salivary enzyme and ends one chapter in the story of digestion.

A good flow of healthy gastric juice depends upon many factors. Regularity in time of meals is one. Habit is a powerful force in digestion as elsewhere, and the habit of responding to food at regular times and those only will do much to keep the stomach healthy. Most people are exceedingly careless in this respect, and good food is often blamed for bad results, when the broken schedule was really what upset the system.

Efficient mastication has already been mentioned as a signal to the stomach to get ready to receive food, and important for sending the food down in such condition that it can be taken care of with ease. The pleasurable sensations from the sight, smell, and taste of food not only "make the mouth water," but the stomach also. Some foods stimulate a flow of gastric juice aside from any pleasant sensations they may produce, and are of great value when appetite fails or when for some other reason the stomach's responses to food in general are weak. Water is such a substance and can be taken a few minutes before or at the beginning of a meal with positive stimulating effect. The most efficient gastric stimulants are those substances which give flavor to meats; hence the advantage of meat early in the meal when it is served, and the value of beginning a meal with soups containing the

extracts of meat, such as bouillon, consommé, and other kinds with meat stock as the foundation, when the stomach responses are feeble. Herein lies the chief value of beef broth for invalids; but, since beef broth itself has little if any fuel value, it should be accompanied by some "real food," which it will help to digest.

The general nervous state of the person is very quickly reflected in the stomach. "Laugh and grow fat" is a wise saw. Attention to the appearance of food on the table and other devices which tend to put the prospective eater in a happy frame of mind are worth while from this point of view. Excitement, worry, anger, chill, fatigue, all tend to retard the digestive processes and the greatest skill in the choice of easily digested food may be of no avail while these unfavorable states persist. If food must be taken under such conditions, it is best sipped in some warm, rather dilute fluid form, such as soup, cocoa, malted milk, gruel, or a raw egg beaten up in milk. Next best is some very dry food which has to be moistened and softened in the mouth and reaches the stomach nearly fluid, such as toast crisp throughout, which may be accompanied by some finely minced, lightly cooked lean meat.

Concentrated foods of various kinds are apt to prove irritating, especially to a sensitive stomach. Among such foods are cheese, candy, nuts, strongly acid fruits. These should be used in small amounts at a time, and in combination with bland foods which will dilute them,—crackers, bread or macaroni with cheese, candy only at the end of a meal (never on an empty stomach, as concentrated sugar is particularly irritating), nuts in small quantities along with other food less rich in fat and less concentrated, acid fruits very much diluted, as in lemonade or cherry tapioca.

The rate, and hence often the comfort, of digestion is further influenced by the proportions of the protein, fat, and carbohydrate eaten. Water passes through the stomach very quickly. Carbohydrates tend to pass out faster than proteins and proteins faster than fats. Mixtures of protein and carbohydrates go faster than proteins alone, but more slowly than carbohydrates. Mixtures of fat and protein, on the other hand, go more slowly than either alone. This retarding effect of fat is an advantage or dis-

advantage according to circumstances. The healthy empty stomach tends to contract rhythmically, with more or less insistence, producing the "pangs of hunger." Its possessor, therefore, may find himself very uncomfortable between meals, complaining that his food does not "stay by him." He does not need a diet that relieves the stomach, but rather one which tends to require some time for digestion, and this can be accomplished by the use of more fat. Such a person can eat pork and beans, sausage, suet pudding, mince pie, and the like without discomfort, especially if leading an out-of-door life. A less vigorous person would find such foods delaying digestion unduly; hence they are usually, and very properly, considered by a sedentary or delicate person hard to digest. The same is true of other foods in which a considerable amount of fat is intimately mixed with proteins or carbohydrates or both, such as fat meats, rich sauces, pastries, and cakes. A good cook is not always the safest provider of the family food because of her tendency to load up all kinds of dishes with cream and butter. The taking of fat is less likely to be overdone if it is served by itself as butter for bread, or as thin cream for beverages and cereals, than when it is used liberally in the kitchen.

Most people can eat large amounts of carbohydrate food with ease if not pasty. Thus bread, in which eight-tenths of the calories are in the form of carbohydrate, constitutes nearly half the diet of the very poor and furnishes fully one-third of the calories in the diet of a great many people all over the world. But there are persons in whose stomachs carbohydrates tend to ferment very easily, usually because of bad mastication, little gastric acid, or poor muscular activity of the stomach due perhaps to too little vitamin B_1. If liberal vitamin B_1 does not "tone up" the alimentary tract sufficiently, such people need to eat less carbohydrate food than others and to rely more upon protein and simple forms of fat for fuel. As already pointed out, sugars ferment more readily and are liable to be more irritating than starchy foods, so that good results are often obtained merely by ruling out sugars and very sweet foods. At other times foods containing much cellulose, such as green vegetables, must be excluded

because the cellulose tends to retard carbohydrate digestion, unless it is removed with a strainer. Usually it is wise to enforce good mastication by the use of hard, dry breadstuffs.

Good stomach digestion depends, in general, upon keeping the whole body in good condition by breathing fresh pure air, taking suitable exercise, cultivating cheerful mental habits; eating a diet rich in vitamin B_1, observing regular mealtimes, and refraining from food at all other times; avoiding food when greatly overwrought or exhausted, or limiting it to simple, warm, fluid foods; masticating thoroughly so that food never goes down in large lumps; paying some heed to the retarding effect of fat on digestion and avoiding large amounts of very concentrated or irritating foods.

Good Digestion in the Small Intestine

Into the small intestine by spurts from the stomach comes material in various stages of digestion, mostly fluid, with small particles of insoluble or still undissolved substances floating in it. Here are enzymes greater in number and more powerful in action than anywhere else in the alimentary canal. The acid gastric juice sends a call to the pancreas through a special "chemical messenger" and out pours a fluid with enzymes for starch, protein, and fat. From the walls of the intestine itself numbers of tiny glands supply a secretion containing enzymes for breaking up the last combinations, setting free amino acids from the larger protein fragments left by the other enzymes, and also dividing all the remaining double sugars into simple sugars. The bile flows into the intestine and makes conditions more favorable for these changes, especially helping in the digestion of fat.

In the small intestine we find two systems of movements. By one the food is very thoroughly mixed with the digestive juices containing the enzymes, and brought into contact with the tiny fingerlike projections on the intestinal walls which absorb the digested materials and start them on their journey to the tissues that need them. By the other, the material is moved along from part to part, meeting fresh surfaces for absorption, and leaving less and less to be pushed into the large intestine.

Good health in the small intestine is very quickly affected by conditions in the stomach. Hence it is fortunate that the stomach is very sensitive to bad feeling and gives us warning of what we may be doing to the more important intestinal tube. Any nervous disturbance affecting the stomach is likely to be shared sympathetically by its neighbor. Anger, fear, and other painful emotions tend to stop digestion in all parts. Bacteria of various kinds thrive in the small intestine, and when food is not digested at the normal rate, are likely to seize it and devote it to their own nourishment. Thus carbohydrates tend to ferment, producing troublesome gases and irritating acids; and proteins to undergo putrefaction, with the formation of products which are more harmful than those formed by carbohydrates, producing, when absorbed into the system, the condition called "auto-intoxication." Fermentation can be lessened by limiting carbohydrate food, and putrefaction reduced by limiting protein food; the dangers of both can be avoided in part by care in mastication and choice of the form in which the food is taken, and in part by a liberal vitamin B_1 intake, promoting normal muscle activity in the intestine.

Good Digestion in the Large Intestine

The large intestine serves in great measure as a receptacle in which the last portions of digested material may be sorted out from the waste which is to be eliminated as of no further use to the body. No digestive enzymes are furnished in its fluids; no such vigorous mixing of food and digestive juices occurs as in the small intestine, though a slow backward movement in the part adjacent to the small intestine forces the material in this part back and forth to insure absorption of all that is useful. At intervals a vigorous downward push forces the waste onward and finally out of the body altogether.

It is very important that these movements of large and small intestine, conveying material along the tract, be normal. If they are too rapid, digestion is left incomplete and the body loses valuable food material, as in diarrhea. If they are too slow, waste accumulates, mechanically irritating to the intestinal walls and to

adjacent parts; bacteria prey upon the retained material, and ample opportunity is afforded for the absorption of any poisons which they may produce, thus laying the foundation for bad complexions, headaches, sensations of fatigue, irritation of the appendix, and other unpleasant conditions.

The peristaltic movement of the large intestine tends to be hindered by many of the habits of civilized life. In the first place, the abdominal muscles are likely to have less exercise and hence to be less vigorous, because of less general physical activity. In the second place, food is likely to be too highly refined. Substantial material is necessary for intestinal muscles to contract upon. If they have to push along only a little stream of soft or fluid material they grow flabby and weak. The only kind of substance that will stay in the tract is something that cannot be digested! Animals get ballast in the form of sand, or bones, or the woody parts of plants. In their natural state many of the foods of man contain considerable woody fiber or cellulose, but by our modern milling processes we remove the bran from grains; in our market gardens we force vegetables so that their fiber is very delicate and then remove the more fibrous parts before they go to the table; we extract only the juice of fruits discarding pulp and skins, and thus make possible a diet almost free from ballast.

Furthermore, modern transportation makes possible a very free choice of food. We are not dependent on a problematic catch of game or fish for meat; we can have it every day and three times a day so long as we have money to buy it. Therefore we may unconsciously eliminate from the dietary or relegate to an insignificant place foods which have a stimulating influence upon the movements of the intestines, foods rich in vitamin B_1 especially the bran and germ of the cereal grains, and also foods with considerable vegetable fiber, which include in addition to bran, many fruits and vegetables.

Finally, habit plays a large part in intestinal activity, as in other digestive processes. If the normal warning is disregarded, it soon becomes ineffective and recalling it becomes increasingly difficult. The greatest stimulus to intestinal movement comes imme-

diately after taking food into the stomach and particularly after breakfast. Thus the omission of breakfast, common with some persons, may mean the loss of a much needed impulse.

From these various causes, constipation is one of the recognized ills of modern life. One has only to notice advertisement of drugs in street cars and on billboards to realize this. But the taking of drugs is a poor substitute for the normal control of the alimentary tract by diet and regularity, and is to be countenanced only when more hygienic measures fail.

Diet for Constipation

In endeavors to remedy or avoid constipation through diet, we may choose, then:

(1) Foods rich in vitamin B_1, such as wheat germ, dried brewers' yeast or yeast extract at least once a day, supplemented by bran, whole grain cereals and whole grain bread. If for any reason these are undesirable, the pure vitamin is obtainable in tablet form.

(2) Foods rich in cellulose, such as celery, cabbage, string beans, asparagus, lettuce, spinach, onions, dried beans and lentils with their hulls, raisins, figs, prunes, and other fruits eaten with their skins, cereals from which the bran has not been removed, such as rolled oats and whole wheat. When still more ballast is required, bran itself can be used in various ways, the pleasantest being as bran bread, muffins, or crackers. Another plant product which serves the same purpose is agar-agar or "vegetable gelatin." This is eaten simply cut into small pieces, along with or instead of some breakfast food, or it can be obtained in the form of wafers. It may also be made into biscuits, or boiled in water, flavored and cooled, it makes an edible jelly.[1] Successful results from the use of such foods depend largely upon taking a sufficient quantity and including them in the diet every day.

(3) Foods yielding vegetable acids, such as lemons, oranges, tomatoes, rhubarb, apples, cider, and other fruits and fruit juices (except blackberries, which are constipating). The acids are mild stimulants to intestinal movement and most people find fruit

[1] One-fourth ounce of agar-agar will solidify one quart of liquid.

pleasant to take. The desired results are often gained by taking fruit or fruit juice the first thing in the morning. For persons of sensitive stomach, very mild fruit should be selected, or fruit juice diluted with water. Hot lemonade, prunes, or figs may be tried at bed time, if they do not cause gas or other discomfort. Liberal serving of fruit at every meal has much to recommend it as a means of counteracting constipation.

(4) Foods tending to yield a little gas in the intestines, such as honey, molasses, spinach, onions, cauliflower, and some others. These ferment slightly; the gas generated breaks up hard masses in the intestine and also acts as a slight stimulant to movement. Carbonated mineral waters may bring about the same result partly because the mineral salts dissolved in them are laxative and partly through the gas with which they are charged. Honey and molasses are best restricted to adults and taken with coarse breads. They must not be used too freely or they will disturb digestion. The vegetables are most effective when eaten raw. Lettuce is now very widely distributed all the year round, and a large serving every day, eaten plain or with a little salad dressing, is an excellent custom. Raw cabbage, shredded and seasoned with a little salt is a good alternative. Along with a large serving of a raw vegetable every day should go at least two large servings of cooked fibrous vegetables such as spinach, asparagus or kale.

(5) A lubricant. For people whose digestion of fat is rather imperfect, fat in liberal quantities is often laxative. Such persons may be benefited by a tablespoonful or two of olive oil before breakfast and the last thing at night. For most people, however, the lubricating effect is lost because fat is digested, hence an indigestible, non-irritating lubricant has been sought and found by modern science in the form of highly purified mineral oil. This cannot be absorbed and helps to soften the residues in the large intestine and aid in their easy elimination. If movement is very sluggish, the oil may slip through without carrying feces with it. If this happens, other laxative materials should be used at the same time (agar-agar for instance) and effort made to improve the activity of the intestinal muscles by suitable exercise.

A large volume of water, two glasses or more, if taken on an

empty stomach, will sometimes start intestinal peristalsis, but since water tends to be absorbed before it reaches the large intestine its action is rather uncertain, differing greatly with individuals. Better results will be obtained if common salt, one teaspoonful to a quart of water, be added. The drinking of water freely is very desirable, as it helps to flush out the system and carry waste products off through the kidneys, even if it does not of itself correct constipation.

Some Anti-Constipation Menus[1]

For Healthy Adults

I

Breakfast: An orange
Cut oats, cream
Wheat germ muffins and honey
Milk to drink (1 cup)[2]
Cup of vegex bouillon

Luncheon: Scalloped corn
Triscuit
Baked apple

Dinner: Vegetable soup
Roast beef
Spinach (large serving)
Baked potatoes (skins eaten)
Cabbage salad (large serving)
Whole wheat bread
Stewed loganberries or figs

II

Breakfast: Stewed prunes
Shredded wheat and wheat germ, cream
Tomato omelet
Whole wheat toast
Milk to drink (1 cup)[2]

Luncheon: Pork and baked beans
Boston brown bread
Sliced pineapple
Oatmeal macaroons

Dinner: Boiled mutton, caper sauce
Stewed onions (large serving)
Lettuce salad, French dressing (large serving)
Bran wafers
Lemon jelly, whipped cream

[1] Two glasses of water or a glass of orange or other fruit juice should be taken each day, on arising.

[2] Buttermilk would be more laxative than sweet milk.

Chapter III

THE COST OF FOOD

It is comparatively easy to plan attractive menus if one does not have to count the cost of materials nor of the labor required in preparation and service, though, of course, it can never be done without some time and thought. With plenty of money, the great danger is in the line of over-elaboration, which is not only inartistic, but tempts to overeating and waste of food. It is better to gratify one's esthetic taste by excellence of quality in food and service than by a multiplicity of dishes. Especially to be shunned are dishes made over-rich with cream and butter, which are not only expensive but upset digestion.

For most people, cost is a large factor in the feeding problem; from one-half to one-fourth of the family income has to be devoted to buying food, and the smaller the income the larger the percentage which must be so spent. Fortunately beyond a certain minimum there is no vital connection between nutritive value and cost. Nutritious and expensive are not synonymous; in fact, some of the most nutritious foods are the cheapest. Cost alone is, therefore, a poor guide for the housewife in determining what she will feed her family. She needs to know some of the factors which influence the cost of food in order to make wise selection, especially if she has to try continually to make one dollar do the work of two.

Factors in the Market Cost of Food

One of the factors in the cost of food is the amount of labor and price of material required to produce it. A potato is cheap, and one will produce several dozen with very little work on the part of the planter. Hence potatoes rank as cheap food. Fish, which forage for themselves and have only to be caught and

brought to market, make cheap meat. Under pioneer conditions meat is in general cheap, since it comes from wild animals. But when grain has to be raised to feed cattle for beef the cost of the animals' food and care makes meat dear. In this country the passing of the great western grazing fields increased the cost of beef, and our present hope of keeping this kind of food within reach of our pocketbooks lies in the utilization of the vast plains of South America, where food for the animals may still be had for nothing. Meat from the Argentine cannot, however, be as cheap as that caught near one's own door, because of the cost of transportation.

Cost of transportation played a small part in domestic economy before the days of express or fast freight and refrigerator cars. But to-day we bring together in one market apples from Oregon, melons from California, oranges from Florida, olive oil from Spain—food products from almost every quarter of the globe—and the expense of this transportation must be added to the original cost of production. The cost of foods out of season is very largely due to their having been brought from a distance.

With the best of facilities for transportation, many foods deteriorate in transit, and any percentage of loss must also be added to their cost. So perishability becomes another factor to be reckoned with. If a carload of peaches goes to market and half of them spoil before they reach the retail buyer, she will have to pay twice as much for what she gets as she would if they had all kept perfectly. Cereal products, dried foods of various kinds, potatoes, onions, and other foods which keep very well are always cheap as compared with strawberries, raspberries, lettuce, and the like, which require careful handling and will not keep long under the most favorable conditions.

With the development of cold storage, perishability is not so great a factor as formerly, but we still have to add the storage charge to transportation costs.

Quick-freezing as a method of food preservation has gained rapidly in popularity because of the convenience in use and fine flavor of the products. The foods to be frozen are carefully selected, gathered at their best, freed of waste, and packed in

waterproof cartons with the minimum of delay in handling and processing. Since there is no labor of preparation for cooking, they save time and add variety to the diet by making available out-of-season foods with the flavor of fresh ones. These foods are available only in centers large enough to justify the expense of a low-temperature case in which to keep them frozen until delivered to the consumer. In some places the housewife can rent a low-temperature "locker" and store in it foods which she can purchase to good advantage in their season and use gradually as desired. The cost of quick-frozen packaged foods must be compared with that of strictly edible material. Thus a pound of fresh peas in the pod, costing 12½ cents, will furnish only about half a pound of shelled peas, of which the actual cost will be 25 cents per pound. When frozen peas can be bought at the same price they will be just as cheap as the fresh market peas and their flavor and tenderness will be superior.

Canning reduces the loss due to perishability and makes transportation of food products simpler, but one must pay for the labor involved in the process as well as the materials, so that canned goods are to be ranked as intermediate in price between dried foods and fresh ones in season, at least under city conditions. One of the foods which canning has brought within the reach of everyone is milk. Canned evaporated milk in 14½ ounce cans at 7 cents per can costs only one cent per 100 calories, a price which cannot be duplicated in fresh milk until its cost is down to 7 cents per quart.

The way in which goods are put up for the market will affect the cost. Package goods are more expensive than the same material in bulk; small packages cost more in proportion than large ones; fancy wrappers often bring a fancy price. Elegant shops and immediate delivery add materially to the original cost. The extra charge for package goods is often worth paying because greater cleanliness is assured, and sealing keeps the material in better condition, to say nothing of the greater ease of storage at home. A small package is a better investment than a large one if part of the large one would spoil before it could be used up. But these things should be realized by the purchaser. Twenty-five

cents invested in two jars of peanut butter, one costing 15 cents, the other 10, will yield 10 ounces of food, while a single 25 cent jar will contain 12 ounces, so that one saves over four cents (a gain of 20 per cent) on the larger purchase. Each housekeeper must decide for herself where the danger of loss and inconvenience of storage counterbalance the gain from large quantity buying, but the tendency in cities is to buy in unnecessarily small quantities, not only because storage space is precious, but because it is so easy to replenish one's larder quickly. In the country, where space is available, there may be the opposite danger of buying in such large quantities that the food either deteriorates before it is used up or a great deal of extra care must be given to keep it in proper condition.

Many foods bring high prices because of the esthetic appeal which they make to the consumer. Size and shape, color, flavor, and texture all play their parts in this appeal. Tender beef is preferred to tough, and since a comparatively small part of each creature is tender the law of supply and demand sends up the price. Large red apples are more attractive than small green ones though the latter may actually have a better flavor. Olive oil is preferred to cottonseed on account of the difference in flavor though the nutritive value is the same. In some markets white eggs are preferred to brown. It is hard to separate this idea of esthetic appeal from nutritive value. We are all inclined to think the foods which we like are good for us and appearance and flavor attract or repel very quickly; but so far as real nourishment goes, these things are secondary and the household provider must be able to discriminate between real nutritive value and other factors in order to spend her money to the best advantage. Just as the finest-looking food of a given kind may not give the best return in nutritive value for the money spent, the cheapest form of the same goods may be an equally bad investment. A peck of apples so small and gnarled that more than the average amount of waste is produced in paring and coring may be dearer than larger ones at a little higher price. A pound of prunes in which there is little flesh and much skin and stone may perhaps be bought for eight cents, but will be satisfactory neither as regards

nutritive value nor flavor; one will get a better return on one's money by spending for this fruit at least 10 or 12 cents a pound. A piece of corned beef at 25 cents a pound may have so much bone and fat that the lean cooked meat will have cost fully 50 cents per pound, while a rump roast of beef at 45 cents a pound will yield lean cooked meat costing no more than the actual cost of the corned beef. Unless the fat of the latter is eaten, it will not be as economical a purchase as the rump roast, though the first cost is less and the total number of calories per pound is greater. Fat meat is never profitable unless the fat is used for food.

Market Cost and Fuel Value

One cannot say, then, that either the dearest or cheapest food is the best to buy. The first cost gives no direct clue to the real part which a food will play in the domestic economy, and different conditions of living must determine what it is wise to invest in. Nevertheless we shall have to know something about the cost of the various essentials of the diet in order to formulate a working program which will apportion our money so that due allowance is made for each.

Since the energy supply is the largest item in the cost of food and since all foods but water and common salt furnish calories, one good way to study cost is in relation to fuel value. If our food allowance is liberal and the fuel requirement of our family low, we may indulge more freely in foods purely for their esthetic appeal. But if we are trying to make every cent go as far as it will

Fuel Values and Cost of Cereals in Packages

Cereal	Total Calories per Package	Price of Package	Cost per 100 Calories
Rice	1590	$0.06	$0.0038
Rolled oats	2252	0.09	0.0040
Farina, light	2873	0.21	0.0073
Cornflakes	869	0.07	0.0081
Farina, with wheat germ	2715	0.23	0.0085
Farina, dark	2460	0.22	0.0089
Puffed wheat	371	0.07	0.0189
Puffed rice	420	0.10	0.0238

toward meeting every nutritional requirement, we must think not only in terms of market conditions and our own task, but of absolute nutritive value. Within any food group there are choices to be made. Take the cereals for example. They come in all sorts of packages, many similar in cost; which is cheapest, which dearest? The preceding table shows the cost per 100 calories of eight of our well-known varieties.

The most casual inspection of the above shows that of all these cereal products rice and rolled oats give the best return in calories for the money. Even taking into account that they require considerable cooking, they are cheaper than one of the cheapest ready-to-eat cereals—cornflakes. It may be perfectly legitimate to serve puffed wheat now and then, but it should be with full consciousness that one is paying about three-fourths for a special mode of preparation and one-fourth for actual fuel value.

In canned goods there is a great deal of difference in fuel value even with the same kind of food, owing to differences in the quality of the raw material, in the amount of water used to fill up the can and in the amount of sugar in sweetened products. At present the only way for the housewife to protect herself is to make her own observations on the amount of "solids" which she gets for her money, the richness of the syrup, etc., and buy those brands which give the best values.[1]

The discrepancy between nutritive value and cost is nowhere better seen than in a comparison of milk with other high protein foods. A quart of milk yielding 675 calories and costing, let us say, 15 cents, is the equivalent in fuel value of about one pound of lean round steak, costing over 40 cents, or of nine eggs, which would be cheap at 30 cents. Even more striking is the case of oysters. A quart of solid oysters is equivalent in fuel value to one quart of milk, but will cost from three to four times as much as fresh milk at 15 cents per quart.

For ordinary purposes, the 100-calorie portion serves as the most convenient unit of comparison, and in the Appendix will be found a table of costs (Table III) classifying into groups at dif-

[1] Much information regarding the purchase of foods in containers will be found in Bryan's *The School Cafeteria*, pp. 345–716, F. S. Crofts and Co. (1936).

ferent cost practically all the foods used in the dietaries in this book, or regarded as common household staples. These give only the cost of food materials; they do not include charges for fuel and labor. Good food cannot be bought for nothing. There are today very few kinds which cost less than three-fourths of a cent per 100 calories. These are mostly cereal products, such as cornmeal, rolled oats, cornstarch, pearl barley, hominy, macaroni, rice and flour; fats, such as corn or cottonseed oil, oleomargarine, suet, lard and lard substitutes and butter substitutes with added vitamin A; sugar, molasses and corn syrup; dried fruits and vegetables such as prunes at eight cents per pound and raisins at nine cents; and dried beans, lentils and peas. A somewhat longer list may be had for one cent per 100 calories or slightly less including cornflakes, dark farina, shredded wheat, evaporated milk, white potatoes, bread, butter at not over 30 cents per pound and salt pork, while for from one to one and one-half cents we may extend our list to plain crackers, butter as high as 50 cents per pound, tapioca and bacon. It will be observed that all of these foods belong to the non-perishable, easily transported class; meat, milk, eggs, fresh fruits and vegetables are not included. For two cents per 100 calories we may add olive oil, onions, kale, canned corn, dried apricots, canned salmon and milk at ten cents per quart. In the country, where fruits and vegetables are comparatively cheap, it will be possible to have a greater variety of food materials than this without going beyond two cents per 100 calories, but in the city fresh fruits and vegetables will range from three cents per 100 calories for apples and cabbage, to 20 cents or more for lettuce, asparagus, celery and melons. Most meats exceed two cents per 100 calories and choice cuts exceed five cents per 100 calories. It is by study of these relative values and judicious combinations of the inexpensive with the more costly foods that the housewife controls her expenditure and yet provides "meals that shall be at once gratifying, satisfying and fundamentally right."

The Cost of Protein, Minerals and Vitamins

Feeding a family on a small income is no mean task. It demands intelligence and much thought, knowledge both of food

values and human needs. One cannot become a finished mistress of the art in a week or a year, but the reward of patient study comes, not only in the saving which may be effected in the cost of living, but also in the increased happiness and efficiency of the well-nourished family and the personal satisfaction of ceasing to grope blindly (which is drudgery) and acquiring a conscious power over one's environment, which makes even the difficult task interesting and joyous.

So far the discussion of cost has dealt with food in relation to fuel value. But we cannot rest content with learning which foods give us the most calories for our money. We must consider the price which we shall pay for building materials—protein, iron, calcium, phosphorus, etc.; and for minerals, vitamins and other regulating factors in the diet. Sugar and oatmeal have the same fuel value per pound (1800 calories) and can generally be bought for the same price. On the basis of calories they are, therefore. equivalent. But a pound of sugar yields nothing but fuel, while a pound of oatmeal will furnish 300 of its calories in the form of protein, and will also yield nearly one-third of a gram of calcium, or almost half the whole day's requirement for a man; one and three-fourths grams of phosphorus, which gives a good margin of safety above his daily need; and 22 milligrams of iron, which is a liberal day's supply. It is an important source of vitamin B_1, yielding about 250 international units per pound and furnishes considerable amounts of vitamin G. We realize what a very cheap food oatmeal is as compared with sugar (which seems at first equally cheap) by stopping to consider what we shall have to pay to get from other foods the protein, minerals and vitamins which the sugar lacks.

The Cost of Protein

Protein-rich foods are, as a rule, a more expensive item in the dietary than those rich in carbohydrates and fats. This is partly because we like them in delicate, perishable, and highly flavored forms, such as meat, fowl, fish, and shell fish. From the nutritive point of view, eggs, cheese, and milk are interchangeable with them, and can usually be substituted with real economy. The

grains and breadstuffs can also be depended upon to a considerable extent, having about the same proportion of protein to total fuel value that we aim to have in a well-balanced diet, *i.e.*, 10 to 15 per cent of their calories in the form of protein. We must remember, of course, that the grain or legume proteins will not make an ideal amino acid assortment *by themselves*. They must be supplemented, and for practical purposes milk, eggs, and meat are all equally good supplements to depend on.

The table below shows the cost of the amounts of different food materials which will yield 100 protein calories, and serves as a rough measure of the relative economy of these foods as sources of protein. One may use milk and navy beans as the chief sources and have a mixture of excellent quality at less cost than milk alone; or one may choose porterhouse steak and have no more efficient a diet so far as protein is concerned (and less valuable in minerals and vitamins) at four or five times the cost of the beans and milk.

Table Showing the Cost of 100 Protein Calories from Different Sources

Food Material	Cost per Pound	Cost of Portion Yielding 100 Protein Calories
Beans, dried navy	$0.09	$0.022
Oatmeal	0.07	0.023
Beans, dried Lima	0.09	0.027
Cornmeal	0.05	0.030
Macaroni	0.08	0.033
Cottage cheese	0.15	0.040
Peanuts in shell	0.20	0.042
Cod, salt	0.21	0.046
Cheese, American	0.24	0.046
Bread, white	0.09	0.053
Bread, whole wheat	0.10	0.057
Milk at 10 cents per quart	0.05	0.083
Halibut	0.35	0.105
Eggs at 35 cents per dozen	0.25	0.116
Mutton, leg	0.26	0.087
Milk at 15 cents per quart	0.08	0.132
Beef, lean round	0.45	0.135
Lamb, leg	0.30	0.104
Eggs at 50 cents per dozen	0.35	0.163
Porterhouse steak	0.50	0.145
Almonds, shelled	0.80	0.210

The Cost of Calcium, Phosphorus, and Iron

It is worth while to compare in a similar fashion some of the foods which are the best sources of the different mineral elements, especially calcium, phosphorus, and iron. In the three tables following the foods are arranged in order of the amount of money required to purchase enough of any one to yield enough of the element under consideration to meet an adult man's daily requirement.

From an inspection of these tables it is easy to see that some foods are cheap from all points of view; thus, dried beans, costing less than a cent per 100 calories for fuel, are also the cheapest food for iron, second cheapest for phosphorus, and third cheapest for calcium. Milk is a fairly economical source of fuel, protein, and phosphorus, exceptionally cheap for calcium, and dear only for

Cost of Portions of Calcium-bearing Foods to Yield 0.67 Gram of Calcium

Food Material	Cost per Pound	Cost of Portion Yielding 0.67 Gram of Calcium
Cheese, American	$0.25	$0.046
Milk at 10 cents per quart	0.05	0.063
Beans, dried navy	0.09	0.090
Milk at 15 cents per quart	0.08	0.097
Peas, dried	0.06	0.115
Onions	0.04	0.070
Buttermilk	0.05	0.145
Oatmeal	0.07	0.159
Beans, dried Lima	0.09	0.187
Carrots	0.05	0.200
Prunes	0.08	0.204
Raisins	0.09	0.222
Celery	0.12	0.227
Beans, fresh, string	0.09	0.261
Bread, whole wheat	0.10	0.295
Peanuts in shell	0.20	0.595
Cornmeal	0.05	0.466
Bread, white	0.09	0.495
Macaroni	0.08	0.536
Eggs at 35 cents per dozen	0.25	0.666
Eggs at 50 cents per dozen	0.35	0.930
Cod, salt	0.21	1.180
Halibut	0.35	7.800
Beef, lean round	0.45	5.460

iron, a condition compensated again in part by the fact that its iron is specially good as far as it goes. Taking all these things into consideration, we must regard milk as inexpensive. This is particularly noticeable when we compare it with lean beef (round), which at 45 cents a pound is just as economical a source of protein as milk at 14 cents per quart. The beef is not to be considered as a source of calcium; is about three times as expensive as milk as a source of phosphorus, and not cheaper than milk as a source of iron unless milk costs over 15 cents per quart.

The tables also show the great economy of dried legumes, not only as sources of calories and protein but also of the mineral elements. String beans afford cheap calcium, iron and phosphorus; and cabbage, green peas, carrots and lettuce not only compare favorably with other fresh foods as sources of iron but are valuable

Cost of Portions of Phosphorus-bearing Foods to Yield 1.32 Grams of Phosphorus

Food Material	Cost per Pound	Cost of Portion Yielding 1.32 Grams of Phosphorus
Oatmeal	$0.07	$0.053
Beans, dried navy	0.09	0.056
Beans, dried Lima	0.09	0.068
Cheese, American	0.24	0.096
Cornmeal	0.05	0.096
Buttermilk	0.05	0.149
Milk at 10 cents per quart	0.05	0.155
Macaroni	0.08	0.161
Cottage cheese	0.15	0.166
Bread, whole wheat	0.10	0.190
Raisins	0.09	0.199
Lettuce	0.10	0.839
Milk at 15 cents per quart	0.08	0.235
Bread, white	0.09	0.282
Cod, salt	0.21	0.284
Peanuts in shell	0.20	0.200
Prunes	0.08	0.322
Spinach	0.06	0.388
Eggs at 40 cents per dozen	0.30	0.390
Cabbage	0.04	0.403
Peas, dried	0.06	0.426
Carrots	0.05	0.443
Mutton, lean leg	0.26	0.453
Beef, lean round	0.45	0.686
Lamb, lean leg	0.30	0.494

for copper and other mineral elements needed in very small amounts. Eggs are hardly to be regarded as a cheap source of iron if we compare them with dried peas and beans, and cereals. But if we compare them with other perishable protein-rich foods, like meat, it is evident that when they do not exceed 40 cents per dozen they may be regarded as a substitute for the cheaper cuts of meat, and when they cost as much as 50 cents per dozen they are, by the balancing of counts, cheaper than porterhouse steak and other expensive kinds of meat. The market price of fresh fruits varies so greatly that no attempt has been made to include them in these tables. They are negligible as regards protein, and not as outstanding sources of minerals as the vegetables. Their chief contributions are to the vitamin content of the diet.

Cost of Portions of Iron-bearing Foods to Yield 0.015 Gram of Iron

Food Material	Cost per Pound	Cost of Portion Yielding 0.015 Gram of Iron
Beans, dried navy	$0.09	$0.030
Beans, dried Lima	0.09	0.035
Oatmeal	0.07	0.053
Raisins	0.09	0.100
Prunes	0.08	0.109
Cornmeal	0.05	0.184
Bread, whole wheat	0.10	0.206
Macaroni	0.08	0.221
String beans	0.09	0.276
Onions	0.04	0.303
Bread, white	0.09	0.331
Eggs at 40 cents per dozen	0.30	0.342
Peas, dried	0.06	0.350
Cabbage	0.04	0.361
Peanuts, in shell	0.25	0.415
Eggs at 60 cents per dozen	0.40	0.513
Cod, salt	0.21	0.526
Almonds, shelled	0.80	0.680
Milk at 10 cents per quart	0.05	0.685
Mutton, leg	0.26	1.391[1]
Milk at 15 cents per quart	0.08	1.027
Beef, lean round	0.45	1.080[1]
Lamb, leg	0.30	1.489[1]

[1] Assuming the availability of the iron to be 50 per cent.

The Cost of Vitamins

Before we had any knowledge of the vitamins some foods, such as tomatoes, appeared to be prized out of all proportion to their nutritive value. Nowadays they are not only counted one of the important staples for vitamin C but also as good sources of vitamins A and B_1. We have learned to pass up no food without seriously inquiring what contributions it is capable of making to the diet.

In regard to the cost of vitamins, each must be considered separately, because of the difference in the distribution of the various substances included in this group. The only foods rich in vitamin D are the fish oils or foods which have been given vitamin D value by irradiation or by addition of some highly potent substance, such as fish liver oils or their concentrates, or irradiated ergosterol. In sunny climates or in sunny seasons, the price of vitamin D is merely basking in the sunlight. In an investigation of rickets among infants and children in Puerto Rico, Dr. Martha Eliot of the Children's Bureau, United States Department of Labor, found only two severe cases, one a baby brought up in a basement, the other a child which had been previously living in a cloudy region of the United States. The ultraviolet rays of the sunlight must play directly on the skin, since they are not transmitted through ordinary window glass or heavy clothing. When there is little available sunshine, some source of vitamin D must be added to the diet. Cod liver oil is generally the cheapest. If purchased in quantities of a pint to a quart, it will cost from one-half to three-fourths of a cent per teaspoonful. The exact number of units of vitamin D can be determined from the label on the package. They may vary from 300 to 900 international units per teaspoonful. The cost of irradiated ergosterol in oil (viosterol) is about the same per vitamin D unit as plain cod liver oil, but this product carries no vitamin A, while the cod liver oil will furnish, "thrown in," 800 or more international units of vitamin A. Concentrates and capsules requiring special manipulations in their preparation are usually at least two to five times as expensive as sources of vitamin D as plain or irradiated cod liver oil. The cost of milk with added vitamin D is usually more than that of plain

whole bottled milk. The Council on Foods of the American Medical Association permits its seal of acceptance on bottled vitamin D milks furnishing 400 units per quart.[1] When the vitamin D costs one cent for 400 units, it is about twice as expensive as the cheapest cod liver oil.

The cost of vitamins A, B_1, C and G from some of the foods which are good sources are compared in the four tables which follow. The foods are arranged in order of the cost of an amount to furnish a good allowance for an adult man for a day. As in the case of the minerals, it will be noted that it makes a great deal of difference, from the point of view of economy, what one selects as the source of each of these vitamins; also it is important to see how far foods which are valuable for protein or some mineral will at the same time furnish one or more vitamins at no additional

Cost of Portions of Vitamin A-bearing Foods to Yield 3000 International Units

Food Material	Cost per Pound	Cost of Portion Yielding 3000 I. U. of Vitamin A
Kale	$0.05	$0.002
Escarole	0.08	0.003
Spinach	0.06	0.004
Carrots	0.05	0.018
Potatoes, sweet	0.06	0.026
Beef liver	0.28	0.026
Apricots, dried	0.23	0.029
Prunes, dried	0.08	0.041
Peas, dried, whole	0.09	0.063
Cornmeal, yellow	0.05	0.073
Cheese, American	0.24	0.085
Beans, string	0.09	0.086
Tomatoes	0.08	0.090
Butter	0.40	0.097
Eggs at 35 cents per dozen	0.25	0.124
Peas, fresh	0.08	0.128
Milk, evaporated	0.07	0.140
Peppers, green	0.16	0.176
Milk at 10 cents per quart	0.05	0.212
Milk at 14 cents per quart	0.07	0.296
Bananas	0.06	0.386

[1] "Vitamin D Milk. The Relative Value of Different Varieties of Vitamin D Milk for Infants: A Critical Interpretative Review," by P. C. Jeans. *Journal of the American Medical Association,* Vol. 106, pages 2066–2069, 2150–2159 (1936).

cost. If we allow a pint of milk a day for an adult man, we shall get 338 calories, 65 protein calories, 0.6 gram of calcium, 0.5 gram of phosphorus and 770 international units of vitamin A, or about one-sixth of a good daily allowance. How can we get the rest of our vitamin A most cheaply? From the table we can see that among the most economical sources are spinach, kale, dried apricots and string beans. A moderate serving of spinach (half a cup) will yield as much vitamin A as 6 quarts of milk and the cost will be very small.

The term "protective" has been happily applied to foods rich in minerals and vitamins, and among these milk has the foremost place since its liberal use protects against dietary deficiencies of so many sorts. Not only do we get vitamin A along with calories, protein and calcium when we buy milk, but also the equally im-

Cost of Portions of Vitamin B_1-bearing Foods to Yield 150 International Units

Food Material	Cost per Pound	Cost of Portion Yielding 150 I. U. of Vitamin B_1
Wheat germ	$0.40	$0.011
Rolled oats	0.07	0.017
Bread, whole wheat	0.10	0.022
Cornmeal, whole grain	0.05	0.027
Beans, Lima, dried, cooked	0.09	0.030
Yeast, compressed (baker's)	0.64	0.042
Peas, fresh, cooked	0.08	0.043
Spinach	0.06	0.052
Cabbage, raw	0.04	0.062
Potatoes	0.03	0.063
Oranges	0.05	0.068
Peanuts	0.20	0.081
Carrots, raw	0.05	0.083
Prunes, dried	0.08	0.083
Pork chops, cooked	0.30	0.095
Beans, Lima, fresh, cooked	0.08	0.103
Tomatoes	0.08	0.152
Lettuce	0.08	0.172
Apple	0.05	0.178
Beef liver	0.28	0.186
Beans, string, raw	0.09	0.195
Bananas	0.06	0.239
Milk at 15 cents per quart	0.05	0.230
Eggs at 35 cents per dozen	0.25	0.323

portant vitamin G. Our pint of milk will furnish one-fourth of what is believed to be a good allowance for an adult man, at no additional cost when the milk is chosen for its contribution of calcium. If we had started with 338 calories in the form of lean beef, the cost would be at least twice as much as for the milk, and we would have only about one-third as much vitamin G, a mere trace of vitamin A, and almost no calcium.

Vitamin B_1 is obtained most economically from the whole grains. The cost of their calories is low, and the vitamin B_1 may be regarded as so much clear gain. A pound loaf will furnish the whole day's supply for a man at a cost in excess of white bread of only one cent. Or if we wish a source with fewer calories, we may get a man's daily allowance of vitamin B_1 from wheat germ for about half what it would cost in the whole wheat bread, even if we have to pay 40 cents a pound for the wheat germ.

Since many foods have little or no vitamin C, or it is destroyed

Cost of Portions of Vitamin C-bearing Foods to Yield 600 International Units

Food Material	Cost per Pound	Cost of Portion Yielding 600 I. U. of Vitamin C
Cabbage, raw	$0.04	$0.011
Peppers, green	0.16	0.011
Spinach, cooked	0.06	0.015
Collards, cooked	0.06	0.017
Grapefruit	0.07	0.020
Cauliflower	0.14	0.021
Orange juice, canned	0.11	0.022
Tomatoes, canned	0.06	0.024
Strawberries	0.10	0.028
Tomato juice	0.07	0.031
Lemons	0.12	0.036
Onions, raw	0.04	0.039
Potatoes, cooked	0.03	0.046
Peas, fresh, steamed	0.08	0.064
Beans, Lima, fresh, cooked	0.08	0.079
Bananas, raw	0.06	0.082
Apple, raw	0.05	0.088
Beans, string, fresh, cooked	0.09	0.133
Carrots, raw	0.05	0.134
Lettuce	0.08	0.188
Carrots, cooked	0.05	0.191

in cooking, experience has taught that the best plan is to have some rich source which will practically guarantee the daily supply. Tomatoes can be canned with little loss of the vitamin and the family supply obtained from the home garden for the cost of the labor. Even commercially canned tomatoes are relatively cheap so that the day's supply of vitamin C for a man may be bought for two or three cents. Canned orange and grapefruit juice can usually be purchased at a price which makes their cost even less than tomato juice since only half as large a quantity is necessary. One of the cheapest sources is fresh raw cabbage, but this is better for a supplementary supply, as the quantity to furnish enough vitamin C for a whole day is too bulky for a daily staple.

COST OF PORTIONS OF VITAMIN G-BEARING FOODS TO YIELD 600 BOURQUIN-SHERMAN UNITS

Food Material	Cost per Pound	Cost of Portion Yielding 600 B. S. Units of Vitamin G
Kale	$0.05	$0.033
Beans, Lima, dried	0.09	0.037
Beef liver	0.28	0.041
Prunes	0.08	0.048
Spinach	0.06	0.079
Peanut butter	0.17	0.112
Escarole	0.08	0.112
Cabbage	0.04	0.125
Cheese, American	0.24	0.159
Lentils	0.09	0.159
Carrots	0.05	0.166
Turnips	0.04	0.173
Wheat germ	0.40	0.177
Peas	0.08	0.191
Cornmeal	0.05	0.197
Beets	0.06	0.199
Milk at 10 cents per quart	0.05	0.200
Raisins	0.09	0.237
Beans, Lima, fresh	0.08	0.237
Eggs at 35 cents per dozen	0.25	0.256
Milk at 14 cents per quart	0.07	0.280
Veal, leg, lean	0.32	0.311
Apricots, dried	0.23	0.320
Cauliflower	0.14	0.353
Bananas	0.06	0.460

Chapter IV

THE MAKING OF MENUS

DIVERSITY of age! Diversity of need! Diversity of taste! How shall the individual requirements be harmonized so that one table may serve all? How shall one pair of hands, if need be, prepare the food required? And how may there be time and energy left for house and clothes and for that "higher life" of the family to which food, clothing, and shelter are after all only the means? Our grandmothers have brought up families without any knowledge of food requirements save tradition—why not do likewise; spend what we can, take what the market affords, and trust in Providence for the results? Alas, science has at least made us aware that "mysterious dispensations of Providence" which robbed families of health and strength could have been averted by a little knowledge and care; that bad feeding kills more babies than any other kind of negligence; "that man's efficiency in this world, if not his happiness in the next, is mainly due to the precautions he takes to use suitable food." To-day the profession of housewife demands knowledge of the needs of each member of her group and ability to supply them under all sorts of circumstances. Happy is he who sits down to the dinner provided for him, without thought of what he must leave out, with a mind free for social pleasure, secure in the skill and *knowledge* of his cook. Happier still the children brought up under the watchful eye of a mother who understands the laws of health and holds them in the highest regard. Patient mastery of the A B C's of nutrition will be repaid a hundred fold. And some of the rewards will be immediate. One grandmother remarked: "The modern way of bringing up children *does seem to make good babies*." Nutrition as a science is not very old, but it has begun to illumine the page of tradition; and mastery of its principles will enable us to proceed

with confidence instead of uncertainty. We have to cope to-day with many new conditions upon which tradition throws no light. Package goods, ready-to-eat foods, hothouse products, strange wares from the ends of the earth—we must learn in these to recognize the old familiar foodstuffs (or to note their absence) and adapt ourselves to the new order. Then when we find that a new food product at $4 a pound contains the same nutritive substances as milk at eight cents a pound, we shall be able to choose intelligently between them. Knowing that milk and egg yolk, which are no trouble to prepare, are better for little children than beef juice, shall we not save ourselves labor and expense? Realizing that the energy value of a food is the same whether served simply or elaborately, shall we not be better able to decide how much elaboration is worth while?

"I shouldn't mind housekeeping if it were not for planning the meals"—how often have we heard this? There is a sort of inevitableness about meals which makes them seem truly awful at times. A hungry family and nothing on the table is terrible to contemplate. But routine (drudgery if you will) loses much of its depressing power when work gains significance. To see the children rosy, the family accounts free from doctor's bills, and an atmosphere of serenity in the home surely compensates for time and thought given to family meals.

The Construction of the Menu

There is a steady demand for menus, and they are always suggestive. But they seldom fit the case exactly. They depend on times and seasons, localities and pocket-books, community customs and individual notions, as well as the state of health and size of families and ages of their members. Hence menus cannot be made wholesale and slavishly followed. The examples which are given in subsequent chapters in this book in discussing the food needs of the different individuals whom one may find in a family group are designed to illustrate principles and may be greatly modified without any sacrifice of nutritive value. A meal may be reduced to a single kind of food material or it may contain many kinds of food and many dishes. If there is only one kind of food

used, the menu is no problem. So the baby, each of whose meals is alike, is not the one the mother has in mind when she worries about "planning meals." Nor are normal young children up to at least four or five years of age much cause of concern on this account; their food is limited in variety and their meals vary little from day to day. It is when the choice of food materials becomes practically unlimited, when selecting for the older children and adults, that the menu looms large, and from this point of view it will be first discussed.

Types of Meal Plans

One great help in the daily task is the standardization of the meals to be served at different times in the day. This will have to be determined for each family group according to its own particular needs. If the family is composed of adults, all sedentary, having ample noon meals, breakfast may be *very light:* fruit, some kind of breadstuff, as toast or rolls, and a beverage, as coffee, cocoa, or milk. Or it may be *light:* fruit, cereal, breadstuff, beverage. If, however, the workers take little food at midday, it may be wise to increase it to *medium:* fruit, cereal, eggs or meat, breadstuff, beverage. If the workers are engaged actively in muscular pursuits, and their total intake for the day must be high, the breakfast should be medium or *heavy:* fruit, cereal, eggs or meat, one other hot dish, breadstuff, beverage. For the mixed family group, where the adults are not very active muscularly, the "light" breakfast is the most convenient type, as it provides at the same time the essentials of the children's breakfast. For some one person demanding more variety, or engaged in work demanding high energy expenditure, an egg or serving of bacon can be added without much extra labor. On the other hand, the sedentary person eating in a group of active muscular workers can pass by the extra dishes and confine himself to the "light" or "medium" breakfast, the "heavy" type being quite unsuited to his needs.

Similarly, various plans present themselves for luncheon and dinner, or for dinner and supper, as the case may be.

As a general rule, digestion is better when there is at least one

hot dish at a meal. This may be a beverage, a luncheon for instance consisting of a beverage and sandwiches. Thus peanut butter sandwiches and cocoa are perfectly practical for a luncheon yielding 700 to 800 calories per capita. Or the hot dish may be a soup, and again sandwiches used to supplement it. Or the hot dish may be a chowder, macaroni and cheese, some creamed vegetable or meat on toast, and the like, served with bread and butter and a beverage. The inclusion of a vegetable rich in vitamins, such as lettuce or other greens, is always desirable. These simple types of luncheon are suited to the sedentary worker, but can be made more pleasing to the palate by the addition of a dessert—stewed or fresh fruit, charlotte russe, blanc mange. Another type of luncheon, still suitable for the sedentary, consists of soup, some other hot dish, such as mentioned above, bread and butter and dessert, to which a beverage may or may not be added. This can be easily varied by substituting a salad for the hot dish—giving a type of luncheon especially wholesome and attractive to sedentary women. For the active worker, especially if engaged out of doors, for whom food must be liberally provided, one or two hot dishes, a substantial dessert (as pie) and a hot beverage, with bread and butter, will give as satisfactory results as a greater variety, if the dishes are high in fuel value. More formal luncheons resemble dinners in type.

A very simple dinner will consist of two hot dishes (as meat and a vegetable), which may be combined and served as one at times, bread and butter, and a dessert, with or without any beverage but water. The addition of another vegetable will make this more pleasing and better supplied with minerals and vitamins. Where it does not involve too much labor, dinner is very happily begun with soup. As already said, this stimulates gastric secretion, the warmth is refreshing, and one is in better condition to enjoy the rest of the dinner with the edge taken off hunger without blunting the appetite. A soup, three hot dishes, a salad, dessert, and beverage, with bread and butter, make a meal elaborate enough for any family. In fact, one of the reasons for difficulty in menu making is the tendency to put too many dishes into one meal. We may apply to foods as well as to house furnishings William

Morris's dictum, "Nothing is beautiful which is not also useful." An added dish should serve a real purpose in a meal, artistic or physiological. A green vegetable is a desirable part of any dinner menu, but *two* green vegetables unless one is raw and the other cooked offer no enhancement to each other and rarely add anything to the effect not already accomplished by one, and it would do just as well to eat two servings of one vegetable as one serving of each of two kinds. Every duplication of this kind makes it so much the more difficult to provide the sauce of variety for the next time.

Foods of mild flavor and the same general texture and color, such as potatoes, rice, macaroni, samp or hominy, and other cereals, serve as "fillers-in" or carriers of calories, whereas other foods of more striking characteristics give piquancy to the meal. There is no particular advantage in multiplying such fillers-in. Served one at a time, they produce a better effect than when several are used together. When these are multiplied, there is always the likelihood that green vegetables, cooked or raw, will be slighted because there are already a sufficient number of dishes. Potatoes are not quite in the same class with the cereals because of their richness in vitamins B and C, iron and some other minerals, but while they may well be used at least once a day, it seems more artistic not to serve them in the same course with rice or macaroni.

Often the dessert furnishes the most energy of any single dish, amounting to as much as 300 or 400 calories per serving. When the first part of the meal is not very high in fuel value, this is all very well; but when "heavy" desserts are not needed to bring up the total fuel value of the meal, a salad or fruit will leave a pleasant impression upon the diners, at the same time relieving the cook of work and increasing the minerals and vitamins.

Food Combinations from the Scientific Standpoint

"What foods go well together?" Many housewives seem to think that there are laws on this point as unalterable as those of the Medes and Persians. As a matter of fact, the answer depends very much upon whether one is an Englishman or an

Eskimo, a Bostonian or a Bengali. The Reverend S. Hall Young, recounting his experiences with John Muir in Alaska, tells what difficulty they had, when they were entertained by the Indians, to keep their food from being drenched with a sauce of seal oil —a special delicacy to their hosts, which tasted very disagreeable to them. A Chinaman does not put sugar on his rice nor in his tea, but what American housewife would omit to offer sugar with both, unless she were serving rice as a "vegetable"?

The study of food combinations is like the old definition of arithmetic, "both a science and an art." As a science it relates chiefly to the promotion of digestibility and the representation of the different food elements in the diet. It has been pointed out in Chapter II that digestion is more likely to be satisfactory for the adult when the meal is not limited to a single food material. Thus bread and milk is to be preferred to milk alone. A meal composed mainly of carbohydrate material leaves the stomach too quickly to suit ordinary meal schedules, and so does one entirely fluid. A meal of fat alone would offer a staggering proposition to an ordinary appetite, and if eaten would digest slowly, giving no zest for another meal soon. A meal of protein alone might have some advantages in an Arctic climate, since it would stimulate heat production and help to give feelings of warmth, but this would be most disadvantageous in warmer regions. Altogether, man finds himself more comfortable with proteins, fats, and carbohydrates well represented in each meal, starch predominating. Since we need such a variety of substances and our everyday method of getting these is somewhat hit-or-miss, we shall insure hitting oftener than missing by the general plan of adding fruit rich in vitamin C at least once a day, potato and some cooked green or yellow vegetable at least once a day, some raw vegetable, such as lettuce, cabbage or tomatoes also once a day, a whole grain cereal or other important source of vitamin B_1 once or twice a day, and milk totaling at least a pint a day for each adult and a quart for each child. We may well add, at least for children, an egg three or four times a week if not daily, and a small portion of liver once a week.

It is desirable to keep the fuel value of any regular meal essentially the same from day to day, but we should go a step further

and see that some foods furnishing iron, phosphorus, and calcium, vitamins A, B_1, C, and G, and "ballast" in the form of cellulose are regularly provided for, and also some regular source of vitamin D. Let us not have a feast and upset our digestions by overeating to-day, and have a famine to-morrow and a headache (perhaps a family quarrel, for such conditions breed them!), but stoke the human furnaces regularly, according to their daily needs. Herein lies the advantage of knowing the relative fuel value of different foods and different dishes. It will keep us from serving to-day a cream soup, a fat meat, sweet potatoes (perhaps glazed, with extra calories from fat and sugar), a vegetable with Hollandaise sauce, a salad with mayonnaise dressing, and ice cream with a chocolate nut sauce—all dishes very high in fuel; and to-morrow a bouillon, a lean fish broiled, riced potatoes, sliced tomatoes without dressing, and watermelon for dessert—a meal which may have less than half the fuel value of the first one—unless we have good reason for making such a change.[1]

Foods which are known to be difficult of digestion should not be massed in the same day, still less, in the same meal. Even though the family enjoys griddle cakes, pork chops, fried potatoes, and plum pudding, do not provide them all on the same day, but spread them over four days in combination with other foods easier to digest. Thus, we might have cantaloupe, grape nuts, and griddle cakes for breakfast one day; tomato soup; cold roast beef, fried potatoes, apple float, and cookies for luncheon another day; and pork chops, mashed potatoes, string beans, orange salad, and caramel custard for dinner another day, giving the enjoyment of these more difficult foods under circumstances favorable to their digestion, and making it possible, where there are young children, to provide for them without an entirely different menu; for of course these dishes, so hard to digest, would be withheld from the children entirely. Dishes which contain large amounts of fat and protein are always slow of digestion and should be eaten with simple carbohydrate food. Thus, chicken salad with mayonnaise dressing, eaten with bread and butter (the butter in

[1] By means of the tables in the Appendix, a rough check can easily be kept on the fuel value of a meal, without any detailed computation.

moderation), may make an acceptable luncheon, but if we add a cup of rich chocolate with whipped cream, or rich ice cream and cake, the chances of a good appetite for dinner are decreased; unless the person is active and out of doors, the effect is apt to be bad in the long run, even if a headache does not immediately follow. Foods which are fried in small pieces, so as to be well loaded with fat, are to be used sparingly and in combination with those having little or no fat. Thus, fried potatoes "go with" lean meat like beef or mutton, and not with fat pork or bacon. Foods fried in large pieces are not necessarily loaded with fat, but their texture is often objectionable. This is the case with fritters, hot doughnuts, and the like. They form pasty masses like other hot breads, and should not be used in the same meal with such breads, pastry, or rich cake.

Concentrated foods should be served with something which will serve to dilute them. Thus cheese, a concentrated protein food, is served with crackers, or combined with a white sauce and served on toast; or mixed with macaroni, rice, hominy, bread, etc., in various dishes. Eaten in this way, it loses its reputation for being indigestible. Butter, a concentrated fat food, is eaten with bread or potatoes; foods mildly sweetened with sugar are more wholesome than rich preserves, cake, or candy. Small portions of many foods can be well borne where larger quantities would do harm, because they are diluted by the rest of the meal.

Foods which stimulate digestive juices should precede those which are negative or tend to retard the flow. Thus, soup precedes other foods; meat is also served near the beginning of the meal.

Foods which promote appetite are placed early in the meal, as fresh fruit for breakfast. Sweets, which dull appetite, should be reserved till the last.

Some people are sensitive to certain combinations which others eat with ease. This can be explained only by some peculiarity of the individual. Impressions that certain combinations do not agree are often based on very little evidence; but if repeated and unprejudiced experiments give always the same result, the troublesome combination should, of course, be avoided by that person. Sometimes the trouble comes from putting together too

concentrated foods. Considerable amounts of highly acid food (as sour cherries), taken immediately after a large quantity of sweet milk to drink tend to make the milk form hard curds in the stomach, which of course interferes with digestion, but when a little acid is combined with the milk and the curd kept from forming a mass, as in lemon milk sherbet or cream of tomato soup, the product is easy to digest.

Catsups, pickles, and highly spiced or very sweet foods of all sorts are irritating to the delicate walls of the alimentary tract and should be used sparingly by the robust, never by invalids, children, or any of delicate digestion.

The results of a digestive upset can never be predicted. They may be immediate or somewhat delayed. They may apparently be slight, or seem most unpleasant. Such an upset may reduce the resistance of the body just at the moment when there is a battle on between body defenses and some invading germ, and the germ wins. The only safe thing to do is to try to live so as to avoid such disturbances.

Food Combinations from the Esthetic Standpoint

A balanced meal does not necessarily mean an artistic one. Whole wheat bread or potatoes and perfectly fresh unheated summer milk will sustain a man for months, but most people would find it uninteresting in a few days and actually palling on the appetite in a week or two. The human being exhibits two psychological tendencies in his diet—one, to stand by the old favorites; the other, to demand variety from day to day. A very radical change in diet is apt to upset digestion. Foreigners suffer from the strange food in a new country as much as from lack of other familiar associations. Some one has said that acclimatization is largely a matter of getting used to the food, and certainly this is an important part. So we find a diet made up of certain staples, like bread and butter, milk and potatoes, welcomed daily, along with variables of all sorts, which help to keep up the appetite as well as to insure the presence of the different food elements required by the body. The menu maker needs to steer a medium course; to recognize this love of variety and yet not to cater to

it to an unnecessary extent. A well-balanced diet, even if monotonous, will be more satisfying in the long run than an ill-balanced one because it will insure better health. The first thing to see to, then, as already indicated, is that the different dietary essentials are represented each day in some form. Then attention may be turned to that variety which comes from differences in form, color, flavor, temperature, and texture of foods, so prized by the expert in gastronomics. The aim of the artist is to arrange a meal not only wholesome, but a joy to all the senses. So long as beauty is a part of life, and the spirit more than meat, the housewife will take pride in assembling her family about a board which delights the eye and "makes the mouth water." Her great care must be, if this spirit is strong in her, to see that she does not sacrifice real body welfare to the eye and the palate.

Not all have a natural gift for making artistic or novel food combinations, and many have little opportunity to study the achievements of others. A visit to a good hotel, restaurant, or tea room, with careful study of the *table d'hôte* menus, will often furnish new ideas for the home table. So to exchange meals with a neighbor and to compare notes on menus is interesting and instructive. Most home magazines furnish menus, and these may well be kept as an aid when one's own ingenuity fails. Also one's own successes should be written down in the household note book for future reference. But there are a few working principles which may at least keep one from committing great gastronomic blunders, and really help in securing a well-balanced diet from day to day.

In the first place, take the day as a unit in planning rather than the single meal; or, better still, plan for the week or the month; at least remember that there should be some variation from week to week and month to month. In the country, the natural procession of the seasons helps to secure this wider variety. In the city, where hothouse products or those from other districts press close on the heels of those from near-by territory, season is more apt to be lost sight of. But here one should learn to use the maximum amount for the year in the height of a given food's season. We may, for instance, serve cantaloupe in New

York from April to November, but it is better for artistic as well as economic reasons to limit our freest use of the melon to August and September, when it is likely to be at its best.

Impressions carry over strongly from one meal to the next and from one day to the next. So, with the exception of certain staples (usually mild in character), such as bread, butter, milk, and the like, try to avoid serving any food in the same form twice in the same day, and, better still, avoid repeating it the same day in any form. When storage facilities are poor and perishable food has to be used up quickly, of course such a rule cannot be rigidly adhered to. And in the country, where a crop like strawberries must be enjoyed to the full in its short season, the effect of variety is gotten chiefly by varying the form in which the food is served. Thus, we may have plain, unhulled berries surrounding a mound of sugar for breakfast, a berry float for luncheon, and a sherbet for dinner, and get a very different impression from each meal. So the country housewife welcomes little books like *Apples in One Hundred Ways* or *Vegetable Cookery*, whereas the city housekeeper, who has perhaps ten or fifteen kinds of fruit at her command at one time, may get her variety simply by changing the species, and is little concerned with different ways of preparing each kind. In fact, she is foolish to spend time in making elaborate dishes when she can get her variety so largely by careful marketing.

Another good rule is to avoid serving a food which gives its pronounced character to a dish twice in the same meal, even in different forms. How often we see tomato soup, tomato catsup, and tomato salad on the same dinner table! Or find soup, meat, and salad flavored with onions, and perhaps onions served as a vegetable also. Care should be taken in cookery to develop the natural flavor of each kind of food, and to add extra flavors sparingly, so that they may be fully enjoyed when they are used.

Serving meals in courses helps to heighten artistic effect, and is often easier than getting everything on the table at once. Courses should contrast with one another; a bland one, then a more highly flavored one; a hot one and then a cold one; a fluid one and then a solid one. The last course should have a pleasant

aftertaste. This is especially emphasized in a formal meal like dinner. Some people prefer a sweet dessert, others cheese, still others coffee or fruit.

Individual courses may consist of one or more dishes. In general, the larger the number of courses, the simpler each one should be. A meal may consist of a single course and still be artistic in effect, exhibiting contrasts and harmonies within itself. Broiled steak, potato balls, watercress, bread and butter, coffee, and fruit not only make a satisfying meal, but show contrasts of form, as between the potato balls and the steak; of color, emphasized by the cress and the fruit; of texture, part being good to chew, part soft, part crisp, and part succulent. On the other hand, a meal composed of cheese fondue, sweet potatoes, creamed carrots, baked bananas, and bread and butter would be equally good from the nutritive point of view, but would weary the eye by sameness of color and the palate by sameness of texture and, to some extent, of flavor. Many popular combinations offer sharp contrasts in texture—crackers and cheese, tea and toast, ice cream and cake; in fact, this kind of contrast seems to play almost as important a part in creating a pleasing effect as good combinations of flavor. Of the latter, there are many familiar examples; cranberry or other acid fruit sauce with fowl and game, mint or peas with lamb, apples with pork, tomatoes with cheese or beef. But it is a mistake to adhere too closely to conventional combinations. Gooseberries are quite as pleasing with chicken as are cranberries; apples are good with beef, and delicious with sweet potatoes; many combinations may be devised which give pleasing effects and make the often used foods seem "different." One secret in the happy use of leftovers is to place them in entirely different surroundings from those in which they were first served; in another meal, perhaps, or at least with other kinds of food. Thus, macaroni served creamed with roast beef for dinner, if not all used, may be made into croquettes and served for luncheon with a cheese sauce. Allowing a considerable interval of time between repetitions of the same dish is another help in creating a sense of novelty. If possible, keep to-day's leftovers till day after to-morrow; repeat a favorite food once in ten days

or two weeks, instead of regularly every week. Even changing the dish in which the food is served will often have an evident effect on the appetites of the family. Mrs. Richards, in one of her numerous "dietary surveys," found the girls of a certain school refusing *en masse* a dessert served in a large baking dish. It was put away till next day, turned out in a fine mold, and the girls not only ate it, but demanded more! A consideration of the menu —the selection and service of foods in a meal—is worth while because it will help the housewife to make her family eat the foods which they ought to have. Skill in cookery and genius in food combinations are only means to this end. The ideal meal is a simple one—whether of one or several courses—in which the different types of food are harmoniously represented, but not repeated, and in which food accessories, such as pickles, spices, preserves, and the like, are little needed because the foods themselves are well cooked and each contributes its own characteristic flavor, texture, form, and color to the making of a well-blended whole.

Summer and Winter Menus

Spells of hot weather have always been accounted disastrous to babies. The well-organized infant welfare work of some of our larger cities has taken account of the fact that more babies die in July and August than in other months of the year and makes preparation for a regular summer campaign for the purpose of remedying this sad condition. While its activities include all kinds of hygienic measures—cleanliness, protection from flies, suitable clothing, etc.—the matter which receives most attention, as most important, is that of food. With this properly supplied, illness and death both decrease strikingly.

In the case of older children and adults, hot weather does not work such havoc, but it does render every one more susceptible to nutritional disturbances and it is well to recognize this in planning the family meals. Sudden and extreme changes in the weather are especially trying and often go unsuspected as the cause of digestive difficulties. When the temperature suddenly drops after a few days of intense heat (especially with high

humidity), one often notes in the newspapers that several prominent men have been stricken about the same time with acute indigestion, and remarks on the coincidence, especially if a number of one's own acquaintances are having the same experience. It is quite likely that the weather is at least in part to blame, and one should be particularly cautious about dietary indiscretions and chill when the thermometer is falling rapidly in the summer time.

Before the days of canning and cold storage it was often quite difficult to have much variety in the winter diet, especially towards spring, when the supply of home preserved fruits and vegetables began to give out. Salt meats and potatoes many times formed the bulk of the ration, and undoubtedly some of the minerals and vitamins were not very well represented, the value of milk as a supplement to such a diet being quite unrealized. So it came about that a low nutritional state was expected with the warm days of spring, and dosing with "treacle and sulphur" was not limited to Mrs. Squeers of Dotheboys' Hall. To-day, with our vastly improved facilities for a rational diet throughout the year, fruits and green vegetables, canned if not actually fresh, take the place of "blood medicines," and cod liver oil becomes a partial substitute for sunshine, so that one may reasonably expect to be as healthy in the spring as at any other time of year.

But warm days do bring a muscular relaxation which reacts on the digestive tract as well as the rest of the body, and we should lighten the task somewhat, if we do not wish to run the risk of an upset. While increases in atmospheric temperature do not affect the activities which go on internally, the amount of energy transformed in muscular work is apt to be more or less unconsciously reduced, and it is well to diminish the energy intake somewhat. Even if muscular work goes on as in cold weather, there is apt to be a lessened muscular tension in sleep, or when resting, and altogether it is wise to eat a little less for a few days till the body has adapted itself to the weather. With lessened amount of food there should go care to choose those things which are most likely to prove easy of digestion—simple

dishes and not too many kinds in any one meal. Foods rich in fat, which, as we have seen, is of all the foodstuffs the most likely to retard digestion, should be withheld—pastries, cakes, sauces, and gravies. Hot breads, particularly with syrups or honey, are especially liable to fermentation at such a time. Foods rich in protein, which alone deserve the term "heating foods", should be used in moderation. The diet should consist of a very moderate allowance of lean meat, or its equivalent in eggs, cheese, milk, or other meat substitute; vegetables very simply cooked, as baked potatoes, boiled onions, quickly cooked cabbage; crisp salads dressed with French dressing, cream dressing (cream and vinegar), or merely a little vinegar and seasonings; fruits in moderation, cooked when there is any doubt as to perfect ripeness or any tendency for them to disagree. Cold desserts of gelatin, cornstarch, tapioca, or frozen custard or fruit juices are not only easy of digestion but refreshing. If taken slowly at the end of a meal frozen dishes will not chill the stomach unduly. This is much better than icing the stomach at the soda fountain between meals. If it is impossible to resist such temptations, it is much better to take a plain soda or phosphate, lemonade, iced tea, or grape juice, than to indulge in ice cream sodas or sundaes. In any case, care should be taken not to drink cold beverages rapidly when warm. The shock to the nerves of the stomach is never good, and may be very severe.

Since the body goes on generating heat at the same rate internally whether the weather be hot or not, the problem of physical comfort in the summer time is one of getting rid of the heat generated. Any physical activity of course increases the amount to be dissipated into the surrounding atmosphere. We may facilitate this heat loss by lighter clothing, by fanning, by cooling baths, or by inducing perspiration if conditions are favorable for its speedy evaporation. This is the reason hot beverages prove cooling to some. On days when the humidity is high this method will not work. The warm beverage will only add to the total discomfort. Cold beverages will take body heat to warm them in the stomach and will carry away body heat

when their water is eliminated, and therefore they are very valuable if not taken too cold or too fast.

Another factor in nutrition in warm weather is the fact that bacteria grow at an amazing rate and extra care must be taken to guard against spoiled food. Even in the refrigerator there is not always safety. Sometimes ice boxes are so poorly constructed that their temperature rises with that of the surrounding air, and food is poorly protected. Especial care should be taken of meat and milk.

In planning a menu for a hot day, it must be remembered that eating habits cannot be radically changed on short notice, without danger of a digestive upset. It is not well to give a person accustomed to hot food entirely cold meals. One hot dish can be provided without much difficulty—a beverage if nothing else. The following are suggested as illustrating good types of summer menus:

Summer Menus

I

Breakfast	Dinner	Supper
Raspberries	Veal cutlet, brown sauce	Creamed macaroni on toast
Cooked cereal with cream	Buttered beets	Sliced tomatoes
Toast	Mashed potatoes	Rolls
Coffee or milk	Lettuce salad	Tapioca fruit jelly with whipped cream
	Wafers with cream cheese	Lady fingers
	Currant jelly	Milk

II

Breakfast	Dinner	Supper
Fresh fruit	Stewed chicken	Scalloped corn
Cornflakes with cream	String beans	Baked potatoes
Toasted muffins	Rice	Stewed fruit
Coffee or milk	Red cabbage salad	Gingerbread
	Shortcake	Milk

III

Breakfast	Luncheon	Dinner
Fresh fruit	Potato salad, mayonnaise dressing	Tomato soup
Cooked cereal with cream	Whole wheat bread and lettuce sandwiches	Saltines
Toast	Fresh sponge cake	Jellied tongue
Coffee or milk	Chocolate or milk	New potatoes with parsley
		Vegetable salad
		Junket ice cream, fruit sauce

Summer Menus—*Continued*

IV

Breakfast	Luncheon	Dinner
Fresh fruit	Minced chicken on toast	Vegetable soup
Shredded wheat and cream	Bread and butter	Bread sticks
Popovers	Orange and grapefruit salad	Salmon loaf, cream sauce
Coffee or milk	Cocoa, tea or milk	Peas
	Marguerites	Boiled potatoes
		Sliced cucumbers
		Fruit sponge with creamy sauce

V

Breakfast	Luncheon	Dinner
Stewed rhubarb	Broiled sardines on toast	Julienne soup
Cooked cereal with cream	Tomato and chive salad	Cold roast lamb
Whole wheat muffins	Brown bread and butter	Currant mint sauce
Coffee or milk	Fresh fruit	Scalloped potatoes
	Cocoa, tea or milk	Cottage pudding with berry sauce

VI

Breakfast	Luncheon	Dinner
Fresh berries	Omelet with asparagus tips	Cream of spinach soup
Puffed rice	Creamed potatoes	Croutons
Frizzled ham	French rolls, twice baked	Nut loaf, cream sauce
Whole wheat toast	Macedoine of fruit	Stuffed peppers
Coffee or milk	Cocoa, tea or milk	Caramel custard
		Vanilla wafers

In cold weather any excess of food beyond immediate needs is apt to be taken care of with greater ease than in summer, and energy requirements often are slightly higher, as cold stimulates to higher muscular tension and greater physical activity. This does not apply, of course, to those who live in hot, close rooms at summer temperature during the winter months. Most people get enough stimulus from the cold to have a little better appetite and a little higher food requirement in winter than in summer. But the most marked difference is usually in digestive power. Certain dishes may safely appear in the winter menu which would be out of place in warm weather. Buckwheat cakes, sausage, doughnuts, baked beans, and mince pie are commonly recognized as winter foods, though it is well to remember that even then they have little place in the dietary of sedentary persons. The man who goes to work out of doors on an icy morning will find a breakfast of fried mush and sausage well suited to his needs. He can digest fat meats and other kinds of food rich in fat without any trouble. But the sedentary person needs

at all times to be careful neither to overtax his digestive system nor to overeat, and children must be protected in winter as well as summer against rich and heavy food.

Winter Menus

I

Breakfast	Dinner	Supper
Stewed figs	Baked ham, brown sauce	Corn chowder
Oatmeal with cream	Southern sweet potatoes	Toasted crackers
Scrambled eggs	Spinach	Orange and date salad
Golden corncake	Apple pie	Bread and butter pudding
Coffee or milk	Coffee or milk	Tea or milk

II

Breakfast	Dinner	Supper
Stewed dried peaches and raisins	Cream of corn soup	Cheese soufflé
Hominy with cream	Hamburg steak with onions	Baked rice and tomatoes
Bacon	Mashed potatoes	Hermits
Whole wheat muffins	Dried Lima beans, stewed	Tea, cocoa or milk
Coffee or milk	Steamed fig pudding, foamy sauce	

III

Breakfast	Luncheon	Dinner
Oranges	Scalloped oysters	Noodle soup
Cornmeal and cream of wheat, with cream	Parkerhouse rolls	Boiled mutton, jelly sauce
Baked sausages	Celery	Baked potatoes
Toast	Stewed apricots	Creamed onions
Coffee or milk	Ginger cookies	Cole slaw
	Tea or milk	Chocolate bread pudding, creamy sauce

IV

Breakfast	Luncheon	Dinner
Stewed prunes	Minced lamb on toast	Tomato bisque
Wheatena and cream	Apple and nut salad	Boiled tongue, vinaigrette sauce
Boiled eggs	Cream cheese	Savory potatoes
Toast	Crackers	Buttered parsnips
Coffee or milk	Cocoa, tea or milk	Mince pie

V

Breakfast	Luncheon	Dinner
Cream of wheat with dates and cream	Macaroni and cheese	Potato soup
Omelet with bacon	Apple sauce	Braised beef with vegetables
Toast	Baking powder biscuit	Scalloped tomatoes
Coffee or milk	Cocoa, tea or milk	Pineapple salad
		Pumpkin pie

Winter Menus—*Continued*

VI

Breakfast
- Sliced Bananas
- Shredded wheat biscuit with cream
- Griddle cakes
- Coffee or milk

Luncheon
- Creamed oysters on toast
- Pickles or olives
- Jellied fruit with whipped cream
- Cup cakes
- Tea or milk

Dinner
- Chicken soup with rice
- Beef loaf, brown sauce
- Mashed potatoes
- Creamed carrots and peas
- Cranberry sauce
- Baked Indian pudding, lemon sauce

Chapter V

FOOD FOR THE ADULT MAN

A HUMAN being requires about twenty-five years to complete his growth. During this time he adds to his stature, gains in weight, and changes in physiological and mental habits. Then he enters upon a period, lasting from a quarter to a third of a century, during which his body may maintain a fairly constant weight, and no marked changes occur in the nature of any of his body processes. He is now the fully built "working machine" and his largest food requirement is adequate fuel for his varied activities.

Some of the general principles governing choice of fuel foods have already been discussed in Chapter II. We are now concerned with the amount of fuel which will maintain the best working conditions. Underfeeding will weaken the body by causing it to draw upon its own substance for fuel; overfeeding will result in the storage of an overload of fat, interfering with normal muscle action and making unnecessary weight to carry, or else it will tax the digestive and excretory systems to the point of injury. Ideal conditions exist when a man carries a normal weight for his height,[1] and his daily intake of food corresponds closely to his daily expenditure of energy.

Energy Requirements of the Adult Man

In the long run, one must gain weight with a surplus of fuel and lose weight with a shortage. Hence the simplest way to tell whether one's energy intake is appropriate is by keeping track of body weight. But if one finds that he is gaining or losing, changes in the diet can be more intelligently effected and the desired results more speedily attained if he knows both his energy

[1] See Appendix, Table IV, Height and Weight for Men at Different Ages.

requirement and the energy content of food consumed. It is not assumed that many people will need to "count their calories" every meal or every day, but that each may use such knowledge to work out for himself a practical food program and to make such changes from time to time as circumstances require. The nature of these changes for the sedentary and the active, the thin and the fat, are discussed in the following pages.

The Sedentary Man

Studies of healthy adult men lying at rest in a respiration calorimeter, after fifteen hours without food, show that in the work of maintaining their internal body processes (circulation, respiration, muscle tension, etc.) they expend about 0.45 calories per pound per hour; that is, a man weighing 154 pounds and lying quietly in bed without food for twenty-four hours would draw upon the tissues of his body for fuel to the extent of about 1665 calories. From this fundamental or "basal" requirement there is no escape while normal life processes go on. If food be taken to make good this loss, the influence of food itself (which somewhat increases energy expenditure, the effect varying with kind and amount of food) must be taken into account in making up the balance. This will add about 10 per cent to the total heat production, so that his expenditure will be about one-half calorie per pound per hour, or 1850 calories for the whole day. Every movement of hand or foot, all the muscular work involved in raising and keeping the body in a sitting or standing position, or in performing the varied activities of daily life, will make definite increases in the energy output; these have been carefully measured in scientific laboratories.

Sitting quietly in a chair, with only the movements usually incident to sedentary living, such as changes of posture, muscular activity in reading, writing, or talking, will make the total fuel cost per hour about three-fifths of a calorie per pound. Hence a man of average weight, spending eight hours in bed and sixteen hours in a chair, will need a daily total food supply of approximately 2100 calories.

Standing involves more energy than sitting, raising the energy expenditure to about three-fourths of a calorie per pound per hour, while walking on a level road at a rate of some three miles an hour, or other light exercise incident to ordinary life, calls for about one calorie per pound per hour. The day's energy requirement of a man of sedentary habits may then be estimated as follows:

Calculated Energy Expenditure for Twenty-four Hours for a Sedentary Man Weighing 154 Pounds

Activity	Pounds	Hours	Calories per Pound per Hour	Total Calories
Sleeping	154	8	½	616
Sitting	154	8	⅗	739
Standing	154	4	¾	462
Walking and other light exercise	154	4	1	616
Total		24		2433

Studies of food requirements of sedentary men of various occupations, as, for instance, writers, draughtsmen, teachers, bookkeepers, shoemakers, tailors, physicians, and others who sit at their desks or watch machinery show that they tend to require from 2200 to 2800 calories per day, as they vary somewhat in weight and activity. It is possible to supply this amount of fuel in the form of cereals, beans, pork, bread and butter (or butter substitute with added vitamin A), with hot coffee and milk, for from 17 to 22 cents a day, or from three-fourths to four-fifths of a cent per 100 calories, but this diet will be deficient in ash constituents and vitamins. Reference to Table III of the Appendix, showing costs per 100 calories of some common foods, will make it clear that the range of foods which can be used in a dietary costing less than one cent per 100 calories is very limited. To secure all the elements for good nutrition, with good appetite and digestion, it is generally necessary to spend somewhat more for food. The following food plan is suggested as a working basis

for the selection of the diet of a sedentary man, when the money allowance is liberal. The cost estimate is based on New York City prices, and in many regions, where meats, milk, fresh fruits, and vegetables are cheaper, the food could be obtained for less. Such a plan will give a diet adequate in proteins, minerals and vitamins and sufficiently easy of digestion for the ordinary sedentary person.

The dietaries worked out from two food plans, one liberal in cost, the other minimal, (pp. 94 and 96) show in detail how the following of such a scheme will insure a well-balanced ration.[1]

A Day's Food Plan for a Sedentary Man

Cost Liberal

Fuel Requirement: 2200–2800 Calories Cost: 2½–3¢ per 100 Calories

Breakfast:	Fruit or fruit juice	75–150 Calories
	Cereal	50–100 Calories
	Eggs or Liver and bacon or Creamed dried beef on toast	100–200 Calories
	Toast or Rolls (hard and crisp) or Muffins	100–200 Calories
	Butter	100 Calories
	Cream for coffee or milk to drink	100–170 Calories
	Top milk for cereal	100–200 Calories
	Sugar for cereal (and coffee if taken)	50–100 Calories
		700–900 Calories

[1] Most of the recipes used in the menu in this and following dietaries are given in the Appendix, Table II.

LUNCHEON:	Vegetable plate (3 or more hot, cooked vegetables) or Broiled fish and greens or Cheese dish and tomatoes	150–250 Calories
	Rolls or bread	100–200 Calories
	Butter	50–100 Calories
	Fruit or pudding (pie occasionally)	150–400 Calories
	Milk to drink (or cream and sugar for coffee)	150–200 Calories
		650–800 Calories
DINNER:	Clear soup and crackers	50–75 Calories
	Roast beef (rump) or Stuffed steak or Meat loaf or Baked fish	100–300 Calories
	Potatoes or Rice or Macaroni	100–150 Calories
	Bread	50–100 Calories
	Butter	50–100 Calories
	A seasonable vegetable (cooked)	100–150 Calories
	Lettuce, celery, or other crisp vegetable	50–150 Calories
	Pudding (made with milk) or Stewed fruit or Ice cream (occasionally)	200–300 Calories
		900–1200 Calories

A Dietary for a Sedentary Man, Based on the Preceding Plan

Cost Liberal

Fuel Value: 2400 Calories — Cost: 2½–3¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Grapefruit (C, B_1, G)[1]	½ medium	10.0	7	100
Shredded wheat biscuit (B_1)	1 biscuit	1.0	13	100
Scrambled egg (A, B_1, G)	⅓ cup	2.5	24	110
Bacon	2 small pieces	0.3	7	50
Whole wheat toast (B_1)	1½ slices 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter (A)	2 tsp.	0.3	—	67
Top milk (10 oz.) (A)	¼ cup	2.7	9	100
Whole milk (A, B_1, G)	⅝ cup	5.1	19	100
Sugar	1 tbsp. (scant)	0.5	—	50
Coffee	1 cup	—	—	—
				777
Luncheon:				
Cream of baked bean soup (B_1, A)	¾ cup	6.1	23	150
French rolls	1 roll	1.3	12	100
Butter (A)	½ tbsp.	0.2	—	50
Apple pie	1 piece (4.5 in.)	4.8	9	300
Cream, thin (A)	2 tbsp. (scant)	0.9	2	50
Sugar	2 tsp.	0.3	—	40
Coffee	1 cup	—	—	—
				690
Dinner:				
Clear tomato soup (C, B_1, A)	½ cup	3.7	4	50
Saltines	2 crackers	0.3	3	33
Roast veal (shoulder)	small serving	2.1	66	100
with stuffing (G)	⅙ cup	0.8	9	100
Gravy (brown sauce)	3 tbsp.	1.7	7	50
Boiled potatoes (C, B_1)	1 medium	3.6	11	100
Green peas, (buttered) (B_1, A, C, G)	¾ cup	3.0	21	100
Lettuce (A, B_1, G) French dressing	1 serving	0.6	—	50
Snow pudding	1 cup	3.3	15	150
Boiled custard (A, B_1, G)	⅓ cup	2.2	13	100
Macaroons	2 macaroons	0.8	6	100
				933
Total for day			295	2400

[1] These letters in parenthesis indicate vitamins present, the one for which the food is most significant coming first.

A Day's Food Plan for a Sedentary Man

Cost Minimal

Fuel Requirement: 2200–2800 Calories — Cost: 1½–1¾¢ per 100 Calories

BREAKFAST:	Raisins, prunes, or tomato juice	50–200 Calories
	Cereal	100–150 Calories
	Toast or hard rolls	100–200 Calories
	Butter substitute with vitamin A[1]	75–150 Calories
	Milk to drink (or top milk for coffee)	150–200 Calories
	Milk for cereal	75–150 Calories
	Sugar for cereal (and coffee if taken)	75–150 Calories
		600–900 Calories
LUNCHEON:	Thick vegetable soup or Scalloped potatoes or Baked split peas and bacon or Creamed string beans on toast with bacon	200–300 Calories
	Whole wheat or rye bread	100–150 Calories
	Butter substitute with vitamin A	100–150 Calories
	Stewed fruit or simple salad	150–250 Calories
	Milk to drink (or top milk and sugar for other beverage)	100–170 Calories
		650–800 Calories
DINNER:	Pot roast or Baked fish or Shepherd's pie or Pan broiled round steak	150–200 Calories
	Potatoes or Turkish Pilaf	100–200 Calories
	A plainly cooked vegetable (stewed cabbage or mashed turnips or scalloped tomatoes)	100–150 Calories
	A raw vegetable or fruit salad (raw carrots and celery; raw cauliflower and lettuce; raw red cabbage and onion; raw apple and celery)	50–150 Calories
	Whole wheat or bran bread	50–150 Calories
	Butter	100 Calories
	Junket or other milk pudding or Milk sherbet or Fruit	150–250 Calories
		900–1200 Calories

[1] Choose a butter substitute which contains added vitamin A.

A Dietary for a Sedentary Man Based on the Preceding Plan

Cost Minimal

Fuel Value: 2408 Calories — Cost: 1¼–1¾¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Apple (C, B_1)	1 medium	5.6	2	75
Cornmeal and cream of wheat, half and half (B_1)	¾ cup	6.8	12	100
Milk (A, B_1, G)	1 cup	8.5	34	170
Sugar	1½ tbsp.	0.7	—	75
French toast	2 slices	2.8	20	200
Coffee	1 cup	—	—	—
				620
Luncheon:				
Scalloped potatoes with cheese (⅕ oz.) (A, B_1, C)	1 cup	6.3	22	190
Whole wheat bread (B_1)	1½ slices 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter or butter substitute with vitamin A (A)	1 tbsp.	0.5	—	100
Stewed apricots (A, B_1, G)	⅜ cup	4.0	6	150
Milk to drink (A, B_1, G)	¾ cup	6.3	25	128
				668
Dinner:				
Swiss steak (G) with gravy[1]	slice 4 in. x 2 in. x ⅝ in.	2.2 (meat only)	73	325
Baked potatoes (C, B_1)	1 large	4.5	16	150
Mashed turnips (C, B_1, G)	1 cup	8.2	10	75
Whole wheat bread (B_1)	¾ slice 3 in. x 3¾ in. x ½ in.	0.7	8	50
Butter or butter substitute with vitamin A (A)	1 tbsp.	0.5	—	100
Cranberry sauce (C)	½ cup	3.0	—	200
Bread custard pudding (A, B_1, G)	½ cup	4.3	34	220
				1120
Total for day			278	2408

[1] Two tbsp. dripping and 1 tbsp. flour added for gravy.

The Muscularly Active Man

Muscular activity greatly increases an individual's total energy requirement. The sedentary occupations demand little more food than would be needed if the person were sitting at rest, though it would be better for sedentary people to take some vigorous exercise each day for the sake of their general health and increase their food intake accordingly. This is particularly true of brain workers and all whose callings involve nervous rather than muscular tension.

Muscular work is usually graded as "light," "moderate," "active," or "severe," light exercise being such as that incident to sedentary occupations, involving few muscles and not much more vigorous than walking at a moderate pace along a level road. The cost of such activity is about one calorie per pound of body weight per hour. "Moderate" exercise is typical of occupations which necessitate quite active use of some parts of the body while sitting, standing, or walking, as in the case of carpenters, mail carriers, house workers, and others. Such exercise means an expenditure of from one and one-fourth to one and one-half calories per pound per hour during working hours, and a daily total for men of average size in such occupations of from 2700 to 3000 calories.

"Active" exercise is sufficiently great to develop muscular strength, as in farmers, masons, and blacksmiths, and requires during active working hours an expenditure of from one and three-fourths to two calories per pound per hour, or approximately 3500 calories per day. "Severe" exercise indicates very heavy muscular work, such as that done by lumbermen, excavators, and stevedores, and calls for fuel equal to as much as three calories per pound per hour during work, so that the total day's food requirement for such men often reaches 4000 calories. "Very severe" exercise may be regarded as equivalent to running at the rate of five miles per hour. Such high energy expenditure is usually for short periods in sports rather than in a regular occupation.

The changes in energy requirement due to differences in activity may be summarized as follows:

Energy Requirements for Different Kinds of Activity

Kind of Activity	Calories per Pound per Hour
Sleeping	½
Sitting quietly	⅗
Standing	¾
Light exercise	1
Moderate exercise	1¼–1½
Active exercise	1¾–2
Severe exercise	3 or more

Energy Requirements for Different Occupations

Occupation	Calories per Man per Day
In bed twenty-four hours	1600–1800
At rest, but sitting most of day	2000–2300
Work chiefly done sitting	2200–2800
Work chiefly done standing or walking	2700–3000
Work developing muscular strength	3000–3500
Work requiring very severe effort	4000–6000

A day's food plan for a man doing severe work is given on page 99. Such work usually insures good appetite and digestion, if the work be done under generally hygienic conditions. Hence more foods rich in fat, such as fried cereal foods, sausage, pork and beans, suet putting, and pie, may be taken without detriment. These have the advantage, too, of raising the total fuel value of the diet without greatly increasing the volume of food to be consumed. Bread made from whole wheat flour will help to increase vitamin B_1 and iron without adding to the cost. At least a pint of milk should be found in the day's dietary, and green vegetables should be used as freely as possible, selecting them with regard to season to keep the cost moderate. Cabbage and canned tomatoes will take the place of more expensive vegetables in the winter. Cabbage should be often eaten raw as one of its important contributions to the diet is vitamin C which is easily destroyed by cooking. The flavor and digestibility of cooked cabbage are also better if the time of cooking is very short.

A Day's Food Plan for a Man Doing Severe Muscular Work

Fuel Requirement: 3500–4000 Calories — Cost: 1¼–1¾¢ per 100 Calories

Breakfast:	Cereal (oatmeal, cornmeal, etc., fried occasionally)	150–300 Calories
	Sausage or Salt fish or Liver and bacon	200–300 Calories
	Toast or Muffins or Corn bread	300–400 Calories
	Butter substitute with vitamin A	150–300 Calories
	Milk for cereal and coffee	200–350 Calories
	Sugar for cereal and coffee	100 Calories
		1000–1300 Calories
Luncheon:	Dried beans, peas, or lentils (baked, or in soup or stew) or Macaroni and cheese or Cheese	200–400 Calories
	Rye or whole wheat bread	200–400 Calories
	Butter substitute with vitamin A	150–250 Calories
	Fruit, fresh or as sauce (bananas, apples, apricots, prunes	100–150 Calories
	Cake or pie	200–400 Calories
	Milk to drink (with or without coffee)	100–200 Calories
		1000–1400 Calories
Dinner:	Meat pie or Stuffed meat and potatoes or Meat stew with dumplings	300–400 Calories
	Savory vegetable (onions, tomatoes, or cabbage)	100–200 Calories
	Bread	200–400 Calories
	Butter substitute with vitamin A	150–250 Calories
	Suet pudding or Bread pudding or Creamy rice pudding	250–400 Calories
	Milk and sugar for coffee	200 Calories
		1300–1800 Calories

Two dietaries based on this plan are given on the following pages, one for 4000 calories at minimum cost and one for 3600 calories at a slightly higher cost level.

A Dietary for a Man Doing Severe Muscular Work, Based on the Preceding Plan

Cost Minimal

Fuel Value: 4058 Calories — Cost 1¼–1½¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Oatmeal mush (B_1)	1½ cups	9.6	34	200
Creamed dried beef (A, G)	¾ cup	6.0	40	250
Old New England corn bread	Piece 2½ in. x 3 in. x 1 in.	3.0	24	300
Butter substitute with vitamin A (A)	2 tbsp.	0.9	—	200
Milk for cereal and coffee (A, B_1, G)	1 cup	8.5	34	170
Sugar for cereal and coffee	2 tbsp. (scant)	0.9	—	100
Coffee	1 cup	—	—	—
				1220
Luncheon:				
Kidney bean stew (B_1, C, A)	1¾ cups	17.1	91	350
Rye bread (B_1)	2⅔ slices 3½ in. x 4 in. x ½ in.	2.8	26	200
Butter substitute with vitamin A (A)	2 tbsp.	0.9	—	200
Banana (B_1, C, A)	1 medium	5.5	5	100
Molasses cookies I[1]	3 large	1.8	12	200
Milk, hot, for coffee (A, B_1, G)	½ cup	4.3	17	85
Sugar for coffee	1 tbsp. (scant)	0.5	—	50
Coffee	1 cup	—	—	—
				1185
Dinner:				
Stuffed beef heart (G)	1 serving	4.0	84	400
Potatoes, boiled (C, B_1)	2 small	5.4	16	150
Carrots (A, B_1, G, C)	4 small	7.8	10	100
White bread	6 slices 3 in. x 3½ in. x ½ in.	4.2	42	300
Butter substitute with vitamin A (A)	2 tbsp.	0.9	—	200
Date pudding II[1]	1 serving	3.5	22	310
Brown sugar for clear sauce	2 tbsp.	0.8	—	100
Milk for coffee (A, B_1, G)	¼ cup	2.1	8	43
Sugar for coffee	1 tbsp. (scant)	0.5	—	50
Coffee	1 cup	—	—	—
				1653
Total for day			465	4058

[1] See Table II, Appendix.

A Day's Dietary for a Man Doing Severe Muscular Work, Based on the Preceding Plan

Cost Moderate

Fuel Value: 3686 Calories — Cost: 1½–1¾¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Wheatena (B_1)	1½ cups	12.0	24	200
Liver (A, G, B_1)	Slice 3½ in. x 2½ in. x ⅜ in.	2.1	63	100
and bacon	4 small slices	0.5	13	100
Whole wheat toast (B_1)	4 slices 3 in. x 3½ in. x ½ in.	2.8	32	200
Butter substitute with vitamin A (A)	2 tbsp.	0.9	—	200
Milk for cereal and coffee (A, B_1, G)	1¼ cups	10.6	43	210
Sugar for cereal and coffee	2 tbsp. (scant)	0.9	—	100
Coffee	1 cup	—	—	—
				1110
Luncheon:				
Split pea soup I[1] (B_1, A, C)	2 cups	16.0	88	348
Rye bread (B_1)	2⅔ slices 3½ in. x 4 in. x ½ in.	2.8	26	200
Butter substitute with vitamin A (A)	2 tbsp.	0.9	—	200
Apple sauce	¾ cup	6.9	3	200
Gingerbread II[1]	Piece 2 in. x 2 in. x 2 in.	2.2	16	200
Milk for coffee (A, B_1, G)	¼ cup	2.1	8	43
Sugar for coffee	1 tbsp. (scant)	0.5	—	50
Coffee	1 cup	—	—	—
				1241
Dinner:				
Stuffed flank steak (G)	Slice 3 in. diam. 1 in. thick	5.1	117	300
Baked potato (C, B_1)	1 large	4.5	17	150
Scalloped tomatoes (C, A, B_1)	¾ cup	7.2	17	150
White bread	4 slices 3 in. x 3½ in. x ½ in.	2.8	28	200
Butter substitute with vitamin A (A)	2 tbsp.	0.9	—	200
Creamy rice pudding with raisins (A, B_1, G)	⅘ cup	3.0	15	200
Milk for pudding (A, B_1, G)	½ cup	4.3	17	85
Sugar	1 tbsp. (scant)	0.5	—	50
				1335
Total for day			527	3686

[1] See Table II, Appendix.

The moderately active man has the advantage over his sedentary brother in that his exercise is likely to give him better appetite and digestion; and he is more fortunately situated than the man doing severe muscular exercise, in that he does not have to buy so many calories with his money. If one has to buy 4000 calories for 60 cents, he must proceed on a plan suitable for 1½ cents per 1000 calories; but if only 3000 calories are required, there will be fifteen cents which can be used to make the dietary richer in vitamins. Since we have learned that a diet which is adequate for the maintenance of the adult can be improved, increasing vigor and resistance to disease, such an investment may be regarded as distinctly advantageous. The following food plan and dietary offer suggestions for the man whose occupation is one involving a moderate amount of physical labor.

A Day's Food Plan for a Moderately Active Man

Fuel Requirement: 3000–3300 Calories   Cost: 1¾–2¢ per 100 Calories

Breakfast:	Whole grain cereal (home cooked or ready-to-eat as preferred)	100–200 Calories
	Creamed fish or Bacon or Scrambled egg	70–150 Calories
	Milk for cereal	170–200 Calories
	Toast or Muffins	100–200 Calories
	Butter or butter substitute with vitamin A	100–300 Calories
	Sugar for cereal and coffee	100 Calories
	Top milk for coffee	100 Calories
		900–1000 Calories
Luncheon:	Hash or Sausage, sauerkraut and potato or Baked Lima beans, tomato sauce	250–350 Calories
	Bread	150–250 Calories
	Butter or butter substitute with vitamin A	150–250 Calories

LUNCHEON—*Continued:*

	Raw apple or banana or Raw vegetable (carrots, cabbage or greens)	50–100 Calories
	Pudding or pie	150–200 Calories
	Milk to drink	150–170 Calories
		1000–1100 Calories
DINNER:	Swiss steak or Baked stuffed pork or Salmon loaf	200–300 Calories
	Potatoes or Rice	150–200 Calories
	Bread	100–200 Calories
	Butter substitute with vitamin A	150–200 Calories
	Cooked vegetable (turnips, carrots, peas)	100–150 Calories
	Lettuce, watercress, celery, or other raw vegetable, plain or with salad dressing	50–100 Calories
	Fruit tapioca or shortcake with milk or Milk pudding or Plain cake and milk to drink	200–250 Calories
		1000–1200 Calories

Underweight Men

Men who are very thin require more calories per pound of body weight than those who have a better weight in proportion to their height. Tables showing what are considered desirable weights from the point of view of health may be consulted with profit and are for convenience included in the Appendix. A reasonable store of body fat is desirable not only as reserve fuel for possible emergencies, but even more because it serves as a protection against jars and bruises and as padding for internal organs, helping to support them in proper position, so that they may work to best advantage. Most important of all it is a sign of well-nourished tissues, less liable to mental and physical fatigue, to nervous disturbances, and to tuberculosis and other infections.

A DAY'S DIETARY FOR A MODERATELY ACTIVE MAN BASED ON THE PRECEDING PLAN

Fuel Value: 3000 Calories   Cost: 2¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Dark farina (B_1, G)	1 cup	9.0	18	150
Milk for cereal (A, B_1, G)	1 cup	8.5	34	170
Bacon	4 small slices	0.5	13	100
Whole wheat muffins (B_1)	2 small	2.0	18	150
Butter substitute with vitamin A (A)	1½ tbsp.	0.8	—	150
Sugar for cereal and coffee	2 tbsp. (scant)	0.9	—	100
Top milk for coffee (A)	3 tbsp.	1.8	5	100
				920
Luncheon:				
Sausages	5 small	2.2	40	200
Sauerkraut (C, B_1)	1⅓ cups	6.6	12	50
Mashed potatoes (C, B_1, A)	½ cup	3.1	7	100
White bread	2 slices 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter substitute with vitamin A (A)	1 tbsp.	0.5	—	100
Apple, raw (B_1, C)	1 medium	6.0	2	80
Cottage pudding	1 slice	1.1	7	100
Lemon sauce	⅛ cup	1.5	—	100
Milk to drink (A, B_1, G)	1 cup	8.5	34	170
				1000
Dinner:				
Veal pie with carrots and potatoes (B_1, C, A, G)	1 serving	8.5	40	400
Whole wheat bread (B_1)	1½ slices 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter (A)	1 tbsp. (scant)	0.5	—	100
Cole slaw (C, B_1, A)	¾ cup	2.1	5	75
Tapioca-cornmeal pudding, (A, B_1, G)	⅘ cup	5.8	36	320
Milk for pudding (A, B_1, G)	½ cup	4.3	17	85
				1080
Total for day			318	3000

100-CALORIE PORTIONS OF FRUIT

Food Material	*Weight (oz.)*	*Measure*
Canned peaches	7.5	3 medium halves and juice
Grapefruit	7.6	1 small
Pineapple	8.2	2 slices 1″ thick
Baked apple	2.3	1 small
Orange	9.5	1 large
Apple, raw	7.5	1 large
Grapes	6.9	1 large bunch
Banana	5.5	1 large
Canned pears	4.7	3 halves and juice
Stewed prunes	2.8	2 prunes and juice
Apple sauce	3.5	⅜ cup

Even if a thin person does not store fat easily, he should persist in eating a diet whose total calories are somewhat in excess of what will maintain his weight. It is possible to get accustomed to a low state of nutrition and not to realize that one might feel gayer and more vigorous with a higher food intake. The under-nourished body tries to conserve its forces by lowered activity, as a general rule. In such cases, trusting to appetite is not safe, and unless special measures, such as change of climate or much life out-of-doors, and an improved dietary with a liberal supply of vitamin B_1, are employed to stimulate a better appetite, there will be no improvement.

The underweight often need more sleep and rest; chronic fatigue may be the prime cause of the poor nutritional state. A "rest cure" may be impossible, but ten minutes of lying down before dinner is something that can usually be accomplished, and the habit of relaxing from time to time can be cultivated. Sitting in the sunshine is a great aid to relaxation, and fresh air is a tonic to a poor appetite.

A health examination should be sought, to be sure that there is no actual disease responsible for a persistent failure to gain weight. It is believed today that the best weight for most adults is the standard weight for height at age thirty. Up to this age, it is better to weigh more rather than less than the average for height and age. After thirty, it is usually easier to gain weight with each succeeding decade, and most elderly persons have to guard against too much rather than too little body fat.

A poorly-assorted diet, as well as one deficient in total calories, may be the cause of emaciation. At any rate, since food is the only source of body substance, persistent high feeding, without indigestion, of a well-balanced diet must be a part of every weight-increasing program. Simple foods are best. Liberal use of butter, cream, and bacon is a great help in increasing the fuel value of the diet. Vegetables can be seasoned with butter, served with cream sauce, or used as salads with mayonnaise, French or cream dressings. Milk can be enriched with cream, and hot milk or cream can be flavored with tea, coffee, or cocoa according to preference. A tablespoonful of cod liver oil daily will not only add

its calories, but also greatly increase the supply of vitamin A, so essential to a high resistance to disease. Many times the undernourished are anemic, and will benefit from more liberal use of egg yolk and liver, both valuable sources of iron and also of vitamin A. The simple use of milk as a beverage at each meal, in addition to the customary diet, may furnish the extra calories which make a little storage of fat possible. Fruit juices can be reinforced by the addition of milk sugar, which will give extra calories without excessive sweetness, and these are generally relished. Cocoa can be made with as many as three tablespoonfuls of milk sugar to the cup and top milk instead of skim milk, thus increasing the calories to about three times those in a cup as ordinarily prepared. Custards and creams of various sorts are valuable means of adding calories to a meal. To improve the appetite and digestion, some special source of vitamin B_1, as wheat germ, dried yeast, yeast extract, or pure thiamin, should be provided.

Regularity in food consumption is very important. There must be a definite program consistently adhered to. Not a meal must be neglected. An extra meal, besides the customary three a day, may prove advantageous, if it does not impair the appetite for the other meals too much. But it should be scheduled, like the other meals, and taken regularly, not spasmodically. A glass of hot malted milk in the late afternoon may prove restful as well as nourishing, or a piece of sweet chocolate in the middle of a long morning may mean less fatigue before noon as well as one or two hundred more calories for the day. Large increases in food intake should not be made too suddenly, lest digestion be overtaxed. Two or three hundred additional calories every day, regularly taken, will have a beneficial influence even if there be no immediate gain in weight. Considerable change in the quality of the tissues can, in fact, take place with no apparent difference in weight, and this, for an adult, is even more significant than weight gains. Systematic exercise, to aid in muscle building, should, if possible, supplement the dietary program. Enough extra calories must be allowed for this, however, or the exercise will result in loss rather than gain.

A Day's Food Plan for a Fattening Dietary for a Sedentary Man

Cost Liberal

Fuel Requirement: 3500–3800 Calories
Ordinary Requirement: 2500–2800 Calories   Cost: 2½–3¼¢ per 100 Calories

Breakfast:	Fruit juice	100–200 Calories
	Cereal with wheat germ[1]	100–150 Calories
	Butter for cereal	50–100 Calories
	Egg or bacon	70–100 Calories
	Muffins or Toast	150–300 Calories
	Butter for muffins or toast	150–300 Calories
	Cream, thin	250–400 Calories
	Sugar	100–150 Calories
	Coffee if desired	— —
		1000–1200 Calories
Luncheon:	Stuffed pepper or Creamed meat or Salad with mayonnaise	200–300 Calories
	Olives or Celery stuffed with cream cneese or Jelly or simple salad	100–200 Calories
	Ry-crisp or crusty roll	100–150 Calories
	Butter	100–150 Calories
	Top milk (upper 18 ounces)	250–300 Calories
	Stewed fruit or Ice cream	150–200 Calories
		1000–1200 Calories
Dinner:	Roast meat with stuffing and gravy or Broiled steak or Fish with egg sauce	250–400 Calories
	Buttered or creamed vegetable	150–250 Calories
	Potatoes	100–200 Calories
	Fruit or vegetable salad with Oil or cream dressing	150–250 Calories
	Nuts, plain or salted	100–150 Calories
	Roll or bread	75–150 Calories
	Butter	100–200 Calories
	Bavarian cream or Tapioca cream or Custard pie or Fruit with cream	200–350 Calories
		1200–1600 Calories

[1] Some cereals can be obtained on the market which have added vitamin B_1 or wheat germ.

A Fattening Dietary for a Sedentary Man Based on the Preceding Plan

Cost Liberal

Fuel Value: 3663 Calories
Ordinary Requirement: 2500 Calories — Cost: 2¾–3¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Orange juice (C, B_1, G)	¾ cup	6.4	4	100
Dark farina with wheat germ and 4 dates (B_1)	¾ cup	7.1	14	200
Scrambled egg (A, B_1, G)	½ cup	4.3	40	200
Toast	1 slice 3 in. x 3½ in. x ½ in.	0.7	7	50
Butter (A)	1 tbsp.	0.5	—	100
Cream, thin (A)	⅚ cup	6.3	18	350
Sugar	2 tbsp. (scant)	0.9	—	100
Coffee	1 cup	—	—	—
				1100
Luncheon:				
Creamed chicken (A, B_1, G)	½ cup	3.6	36	218
on toast	2 slices 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter (A)	2 tbsp.	0.9	—	200
Lettuce salad (C, A, B_1, G)	1 serving	1.8	2	10
Boiled dressing (A, B_1, G)	2 tbsp.	1.4	5	50
Saltines	3 saltines	0.4	5	50
Vanilla ice cream II (A)[1]	½ cup	3.1	8	200
Top milk for café au lait (A, B_1)	⅞ cup	6.6	30	175
				1003
Dinner:				
Cream of corn soup	¾ cup	5.9	20	150
Roast beef (G)	2½ slices	4.0	115	250
Baked potato (C, B_1)	1 medium	3.0	11	100
Buttered Lima beans (B_1, A, G)	⅜ cup	2.6	23	150
Whole wheat bread (B_1)	1½ slices, 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter (A)	2 tbsps.	1.4	—	200
Pineapple and carrot salad (A, B_1, C, G)	1 serving	5.6	5	200
Baked apple (C, B_1)	1 large	4.5	3	200
Cream, thin (A)	¼ cup	2.0	6	110
Sugar	2 tbsp. (scant)	1.0	—	100
				1560
Total for day			382	3663

[1] See Table II, Appendix.

A Day's Food Plan for a Fattening Dietary for a Sedentary Man

Cost Minimal

Fuel Requirement: 3500–3800 Calories
Ordinary Requirement: 2500–2800 Calories — Cost: 1½–1¾¢ per 100 Calories

Breakfast:	Stewed dried fruit or tomato juice	50–150 Calories
	Cooked cereal with wheat germ	150 Calories
	Butter substitute with vitamin A in cereal	100 Calories
	Milk	250–350 Calories
	Toast	150–200 Calories
	Butter substitute with vitamin A for toast	100–150 Calories
	Jam for toast	100–150 Calories
		1000–1200 Calories
Luncheon:	Baked split peas with bacon or Cheese fondue or Baked bananas and rice	250–350 Calories
	Milk to drink	160 Calories
	Raisin or Boston brown bread	200–250 Calories
	Butter substitute with vitamin A	150–200 Calories
	Ginger bread, chocolate icing or Cocoa tapioca or Prune pudding	200–300 Calories
		1000–1200 Calories
Dinner:	Baked sausage or fish or Irish stew with dumplings or Liver and noodle loaf	300–350 Calories
	Potatoes	100–200 Calories
	Cooked carrots or turnips or string beans and butter substitute with vitamin A	150–250 Calories
	Tomato jelly or red cabbage and onion salad	100–200 Calories
	Whole wheat bread	100–150 Calories
	Butter substitute with vitamin A	100–150 Calories
	Milk to drink	160 Calories
	Squash pie or Brown Betty or Junket with hermits	250–350 Calories
		1400–1600 Calories

A FATTENING DIETARY FOR A SEDENTARY MAN BASED ON THE PRECEDING PLAN

Cost Minimal

Fuel Value: 3626 Calories
Ordinary Requirement: 2500 Calories   Cost: 1½–1¾¢ per 100 Calories

MEAL	MEASURE	WEIGHT OZ.	PROTEIN CALORIES	TOTAL CALORIES
BREAKFAST:				
Stewed dried apricots (A, B_1)	⅜ cup	4.0	10	150
Wheatena and cream of wheat, half and half with 1 tbsp. butter substitute with vitamin A, stirred in (B_1, A)	¾ cup	6.0	12	200
Milk for cereal (A, B_1, G)	¾ cup	6.4	26	128
Hot milk for café au lait (A, B_1, G)	¾ cup	6.4	26	128
Sugar for café au lait	1 tbsp. (scant)	0.5	—	50
Whole wheat toast (B_1)	1½ slices 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter substitute with vitamin A (A)	1½ tbsp.	0.8	—	150
Apple butter	2 tbsp.	1.5	1	100
				1006
LUNCHEON:				
Baked bananas (A)	2 bananas	11.0	10	200
Steamed rice	1 cup	6.0	13	150
Butter substitute with vitamin A (A)	1 tbsp.	0.5	—	100
Rye bread (B_1)	4 slices 3½ in. x 4 in. x ¼ in.	2.1	20	150
Peanut butter (B_1)	1½ tbsp. (scant)	0.9	28	150
Milk to drink (A, B_1, G)	⅝ cup	5.1	19	100
Chocolate blanc mange (A)	⅝ cup	4.8	20	250
Milk for blanc mange (A, B_1, G)	⅝ cup	5.1	19	100
				1200
DINNER:				
Veal and pork loaf (G)	Slice 4 in. x 6 in. x ⅜ in.	4.2	120	300
German fried potatoes (C, B_1)	1 cup	5.8	10	200
Buttered Lima beans (B_1, A, C, G)	⅜ cup	2.5	24	150
Whole wheat bread (B_1)	1½ slices 3¾ in. x 3 in. x ½ in.	1.4	16	100
Butter substitute with vitamin A (A)	1 tbsp.	0.5	—	100
Red cabbage and apple salad (C, B_1, A, G)	1 serving	3.2	5	100
Milk to drink (A, B_1, G)	1 cup	8.5	34	170
Coffee junket (A, B_1, G)	¾ cup	6.0	14	200
Hermits (A)	2½ cookies 2 in. diam.	0.9	6	100
				1420
Total for day			449	3626

Overweight Men

The disadvantages of thinness are perhaps more fully appreciated by men than those of being overweight. A "lean and hungry look" does not suggest serenity, jollity, and prosperity, as does a little corpulence. But because some store of body fat is desirable, it does not follow that increase in weight should have no limit. During childhood and youth, weight somewhat over the average for height and age is desirable; but by the age of 35 or 40, and thereafter, statistics indicate that a weight normal for the individual at age thirty is better than the heavier weight commonly found in more mature people.

As men grow older they tend to less and less activity; they are willing to sit for hours, a thing no healthy boy would do; they give up active sports like swimming and tennis and take to golf and poker. Their internal as well as their external activities slow down only a trifle at first, but each year a little more, so that in the course of time the sum of the decrease is considerable. Yet their appetites may be as keen as ever, and interest in eating as an amusement decidedly on the increase. What is the result? More fuel is taken in than is burned off. It is a simple matter of arithmetic. If you eat 3000 calories a day when you could maintain your weight on 2500, you have started to store "excess baggage." That 500 calories a day stored steadily will soon mean pounds of fat on the bathroom scales. "You eat too much, no matter how little it is, *even if it be only one bird-seed daily*, if you store it away as fat," says Dr. Lulu Hunt Peters in her amusing but practical "Diet and Health with Key to the Calories."

Too much fat is detrimental to the best health. It is apt to interfere with the healthy play of the muscles, causing them to deteriorate and laying the foundation for weakness of the heart. Excessively fat people seem predisposed toward gout and diabetes. It is usually much easier to keep the weight from becoming excessive than it is to take off fat once it has accumulated. Sudden gains in weight, as sudden losses, should be brought to the attention of a physician, but steady gains in weight in a healthy person mean that he has been eating beyond his requirements, and he should devise a plan which will keep his food intake in proper

relation to his needs. Increasing exercise will help to burn off fat, but as Dr. Russell H. Wilder says in "Your Weight and How to Control It," "The appetite is tremendously stimulated thereby, so that restricting the diet becomes an exquisite torture. Excessive exercising is a tedious ordeal for most persons and sooner or later is neglected. In the meanwhile the habit of eating a great deal has been formed, and this habit, as well as the appetite, continues long after the exercising has been given up; thus pound after pound is added to the weight and any reduction that has resulted from the exercising is overbalanced." Far better is it to be forewarned of the tendency to take on weight in adult life, and make a systematic plan of eating which shall keep the food intake close to requirement.

A fat man requires less fuel per pound of body weight than a thinner man. Fat represents "dead weight." The actual amount of working muscle may be no more and perhaps actually less than in another man who tips the scales at a lower figure but has no cushion on the back of his neck and no "bay window" in front. For this reason overweight people often complain that they stay fat when they eat less than their thinner friends. They will! They must eat less than they themselves need if they are to burn off any superfluous fat. Reducing the food intake below the daily calorie requirement will always reduce weight if persisted in, year in and year out. A few days or weeks will do no good. The exact number of calories which will result in a definite weight loss in a given time cannot be stated. Losing weight is, physiologically speaking, more complicated than it appears to be. A weight loss of more than one or two pounds a week is not desirable, except under the immediate supervision of a physician. The first thing is to find out approximately how many calories are required according to age, weight, and activity and then plan to take one-fourth off this calorie allowance if only a little overweight, one-third off if from 20 to 25 per cent overweight, and one-half off if over 25 per cent overweight, watching the scales from week to week.

Foods very high in fuel value, as fats and cooked foods con-

taining much added fat, are to be avoided, and foods of low fuel value but rich in minerals and vitamins used to satisfy the appetite. Even then, considerable self-denial is necessary, because eating enters so much into the social life of adults, and it takes real forethought and resolution not to follow the crowd. Clear soups should take the place of cream soups, butter and cream should be almost eliminated, and the vitamin A which they would furnish be taken as halibut liver oil or some vitamin A concentrate. Sugar should be used very sparingly if at all, and cakes, pies, confectionery, nuts as side dishes and soda fountain delicacies avoided entirely. For sweetening coffee, tea or grapefruit juice saccharin, which furnishes no calories, will be satisfactory. Green vegetables of all kinds, raw or plainly cooked, such as cabbage, celery, lettuce, spinach, kale, Brussels sprouts, cauliflower, asparagus, should be freely eaten. Salad dressings of excellent flavor can be made with mineral oil which yields no calories. Bread and cereals should for the most part be omitted but bran and wheat germ as sources of vitamin B_1, can be used as a breakfast food or in muffins or dried yeast tablets or some vitamin B_1 concentrate can be used to supply this vitamin. Fresh fruits should be substituted for made desserts. Strictly lean meats, simply cooked (no sauces or gravies) may be used liberally in conjunction with generous quantities of green vegetables. At least one cup of whole milk (or skim milk and butter equivalent to the cream in the whole milk) should be included in every day's diet, and another cup of skim milk can often be used to advantage. One egg or the same number of calories of cheese a day is also desirable.[1]

For a man of sedentary occupation whose normal weight is 154 pounds, the day's energy requirement has already been estimated as approximately 2400–2500 calories. This man would need very few more calories to maintain 50 pounds of fat, or a total body weight of 200 pounds. If he weighs 200 pounds and wishes to reduce 50 pounds in a year, he would need to deduct at

[1] Further helpful suggestions will be found in Axtell's *Grow Thin on Good Food*, Funk and Wagnalls Co. (1930).

least 500 calories per day from his requirement calculated for his height, *normal weight*, and usual activity, and for more rapid deduction he would need to subtract as many as 1000 calories from his daily requirement.

A Day's Food Plan for a Reducing Diet for an Overweight Man

I

Food Allowance: 1400–1500 Calories
Ordinary Intake: 2500–2800 Calories — Cost: $2\frac{3}{4}$–$3\frac{1}{2}$¢ per 100 Calories

BREAKFAST:	Fruit or fruit juice, unsweetened	25–100 Calories
	Wheat germ[1]	50 Calories
	Eggs (1 or 2)	70–140 Calories
	Whole wheat or bran bread	25–50 Calories
	Milk	75–85 Calories
	Coffee	— — Calories
		300–400 Calories
LUNCHEON:	Tomato or vegex bouillon	10–25 Calories
	Cracker or croutons	15–25 Calories
	Broiled fish or steak	150–200 Calories
	Cooked leafy vegetable (no butter)	20–50 Calories
	Turnips or carrots or potato	50–75 Calories
	Butter for one vegetable	50 Calories
	Raw fruit or raw vegetable salad, mineral oil dressing	50–100 Calories
		400–500 Calories
DINNER:	Fruit cocktail (no sugar) or Raw oysters or clams	50–100 Calories
	Strictly lean meat	150–250 Calories
	Cooked green vegetable (no butter)	25–50 Calories
	Potato or bread	75–100 Calories
	Butter for potato or bread	50 Calories
	Green salad, mineral oil dressing	30–50 Calories
	Cracker and cheese or Raw fruit	75–100 Calories
	Milk	75–85 Calories
		550–650 Calories

[1] Yeast or vitamin B_1 may be substituted.

A Reducing Dietary for an Overweight Man Based on the Preceding Plan

Fuel Value: 1453 Calories
Ordinary Requirement: 2500 Calories | Cost: 2¾–3¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Grapefruit juice (C, B_1, G)	⅓ cup	2.8	1	33
Wheat germ, flaked (B_1, G)	3 tbsp	0.4	14	50
Eggs (A, B_1, G)	2 eggs	3.8	50	140
Whole wheat bread (B_1)	1 thin slice	0.5	4	30
Coffee[1]	1 cup	—	—	—
Hot milk for coffee (A, B_1, G)	½ cup	4.3	17	85
				338
Luncheon:				
Tomato bouillon (C, A, B_1, G)	1 cup	8.5	21	25
Soda cracker	1 cracker	0.2	3	25
Halibut steak, broiled, with lemon	large serving	6.0	122	200
Asparagus, plain (B_1, C)	10 stalks	8.0	16	50
Potato, boiled (C, B_1)	1 small	2.7	8	75
Butter for potato (A)	½ tbsp	0.3	—	50
Apple, raw (C, B_1)	1 medium	4.9	2	65
				490
Dinner:				
Raw oysters (B_1, G, A, C)	6 oysters	3.6	25	50
Roast beef, strictly lean (G)	large serving	5.8	162	250
String beans, plain boiled (A, B_1, C, G)	½ cup	2.0	5	25
Potato boiled (C, B_1)	1 small	2.7	8	75
Butter for potato (A)	½ tbsp	0.3	—	50
Tomato and lettuce salad, with mineral oil dressing (C, B_1, A, G)	1 serving	5.3	6	30
Cheese, Swiss (A, B_1, G)[2]	slice 3½ in. x 2¼ in. x ⅛ in.	0.4	12	50
Water cracker	1 cracker	0.1	1	10
Coffee[1]	1 cup	—	—	—
Hot milk for coffee (A, B_1, G)	½ cup	4.3	17	85
				625
Total for day			492	1453

[1] Saccharine may be used for sweetening, if desired.
[2] Roquefort, Pineapple, Brie, or American may be substituted.

A Day's Food Plan for a Reducing Diet for an Overweight Man

II

Food Allowance: 1800–2000 Calories
Ordinary Intake: 2800–3000 Calories — Cost: 2–2½¢ per 100 Calories

Breakfast:	Fruit or fruit juice, unsweetened	25–100 Calories
	Wheat germ or bran	50 Calories
	Egg or small lamb chop, fat removed	70–100 Calories
	Whole wheat toast or rolls or bran muffins	100–150 Calories
	Butter	50–75 Calories
	Milk	85–100 Calories
	Coffee	— —
	Sugar	50 Calories
	Halibut liver oil capsule	2 Calories
		450–550 Calories
Luncheon:	Lean meat and green vegetables or Hot vegetable plate (3 or 4 vegetables) or Turkish pilaf and bacon or Thick vegetable soup	150–200 Calories
	Crisp roll	100–150 Calories
	Butter	50 Calories
	Milk	170 Calories
	Banana or other raw fruit or Lettuce salad	100–150 Calories
		600–700 Calories
Dinner:	Roast veal or other lean meat	200–250 Calories
	Potato	100–150 Calories
	Cooked green vegetable	50–75 Calories
	Mixed green salad with mineral oil dressing	30–50 Calories
	Bran bread	100 Calories
	Butter for potato and bread	100 Calories
	Raw fruit or plain gelatin jelly	100–150 Calories
		700–800 Calories

For the first few days a reducing diet seems difficult, but the stomach soon gets adjusted to receiving less food, and as long as the diet is adequate in everything but calories there will soon come a feeling of well-being. Care should be taken to drink liberal amounts of water, and if necessary, a tablespoonful of mineral oil may be taken to avoid constipation, although with sufficient vegetables low in fuel value this is hardly likely to be necessary.

A Day's Dietary for a Reducing Diet for an Overweight Man

Fuel Value: 1804 Calories
Ordinary Requirement: 3000 Calories   Cost: 2¼–2½¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Tomato juice (C, A, B_1, G)	½ cup	4.3	5	30
Egg (A, B_1, G)	1 egg	1.9	25	70
Bran and wheat germ muffins (B_1)	1 muffin	1.5	21	114
Butter (A)	½ tbsp.	0.3	—	50
Milk (A, B_1, G)	⅝ cup	5.1	19	100
Sugar	2 tsp	0.4	—	50
Coffee	1 cup	—	—	—
				414
Luncheon:				
Broiled halibut (G) with lemon (C)	piece 3½ in. x 1¼ in. x 1½ in	5.0	92	150
Brussels sprouts (C, A, G)	6 sprouts 1½ in. diam.	3.1	15	50
Whole wheat roll (B_1)	1 roll	1.3	12	100
Butter (A)	½ tbsp.	0.3	—	50
Milk to drink (A, B_1, G)	1 cup	8.5	34	170
Sliced banana with orange (C, A, B_1)	1 banana, ¼ cup orange	7.5	5	125
Sugar	1 tsp	0.2	—	25
				670
Dinner:				
Broiled hamburg steak (G)	2 cakes, 2½ in. diam. ⅞ in. thick	4.0	110	200
Baked potato (C, B_1)	1 medium	3.0	11	100
Peas (A, B_1, C, G)	⅝ cup	2.6	21	75
Tomato and cucumber salad with French mineral oil dressing (C, A, B_1, G)	1 serving	9.6	10	45
Triscuit (B_1)	2 squares	0.5	6	50
Butter (A)	1 tbsp.	0.5	—	100
Coffee jelly	½ cup	4.5	10	50
Whipped cream (A)	3 tbsp.	0.9	2	100
				720
Total for day			398	1804

Building Material for the Adult Man

When a steam engine transforms the energy of coal into useful work, about nine-tenths of the total amount of energy present in the fuel will be unavoidably converted into heat and dissipated into the surrounding atmosphere, and only one-tenth actually transformed into useful work. In the finest motors the skill of the designer has succeeded in reducing this inevitable loss of potential working power to about seven-tenths. Man is a much more efficient machine than the ordinary engine, being able to convert up to a third of his energy into muscular activity when well trained to his work (very commonly as much as one-fifth) and also utilizing the heat which is a by-product of his activities to maintain his body temperature. Man can also do his work with comparatively little wear and tear on the body itself, provided he treats it with the same care that would be given to any other high grade machine—supplies fuel in suitable forms and amounts, keeps within the limits of its work capacity, and sees that it is well oiled (furnished with regulating materials) and clear of waste.

Nevertheless, as we have seen in Chapter I, it is a law of life that some old material shall constantly be replaced by new, and we must take into account a daily loss from the body of substances entering into its intimate structure or serving to modify and control its processes, such as nitrogen, phosphorus, iron, and calcium. We must find out how the diet is to compensate for such daily losses which are a part of normal life.

The Protein or Nitrogen Requirement

During much of the nineteenth century biological chemistry was dominated by the ideas of the great organic chemist, Liebig. He thought muscular work to be performed at the expense of the muscle itself, and taught that the only way to maintain muscular strength was to eat protein food, as much like the body protein as possible, namely, meat. But near the middle of the century this idea was subjected to scientific investigation, and convincing, though crude, proof adduced to show that a man doing a day's work without protein food would by no means burn enough of his

body protein to account for the work done; in fact, would burn scarcely more than if he had not been working at all. It became apparent, therefore, that fats and carbohydrates were the main source of muscular energy, a fact fully demonstrated before the opening of the twentieth century.

If a diet be ample in fuel, chiefly as carbohydrate and fat, the loss of a small daily amount of protein (for each individual in health) proceeds quite uniformly, whether his life be active or quiet. Muscles do not "break down" in exercise; rather they tend to "build up," or increase in size and strength, and thus to store protein in their own structure rather than to use up what they have. Accordingly, the actual requirement for protein in the diet is independent of the amount of physical exertion, and remains fairly constant whether the individual be leading the sedentary life of an office or the strenuous life of outdoor work on the farm or in the lumber camp. The requirement for fuel, on the other hand, will vary tremendously with the kind and amount of work, as previously shown.

The fact that protein food is both a fuel and a building material makes its place in the diet confusing. When burned for fuel, the nitrogen is gotten rid of as speedily as possible, beginning to appear in the urine within an hour or two after a meal, and the non-nitrogenous fragments then burn like carbohydrate or fat. When protein is needed for building material, the nitrogen is retained in the body to help form new body protein. There is, however, no provision for storing a surplus against a rainy day. What is not needed is excreted and that for future use must come from future food. It is possible to take the whole day's fuel in the form of protein food, lean beef, but a man requiring 3000 calories would have to eat nearly five pounds and would get eight or nine times as much protein as actually needed to keep up his body protein. Since protein food is expensive, this would be uneconomical, and there would be shortages of various minerals and vitamins which are equally essential. By substituting foods furnishing carbohydrate, or fat and carbohydrate together, as vegetables and fruits, bread, butter, and the like, for part of the protein, a much more satisfactory diet can be arranged.

In scientific laboratories detailed experiments have been made to try to establish the ideal proportion of protein in the diet, and with plenty of fuel it is found that the protein will be used very economically. At the same time, protein is good fuel itself, and there is no reason for restricting one's intake to the minimum, under ordinary circumstances. For a man of average weight, from two to two and one-half protein calories per pound of body weight will adequately protect the body against protein starvation and leave some surplus to be burned as fuel.

Where strict economy must be practiced, it is well to remember that the use of protein simply for fuel is extravagant. On the other hand, many protein foods are easy to digest and when economic conditions do not forbid may be used more freely. There are limits, however, beyond which it does not seem wise to go. When a very large proportion of the day's fuel is protein material there is produced in the body a kind of stimulation which results in an increased production of body heat. This is of no advantage so far as we know, except when a person is exposed to cold and can utilize this heat to maintain his body temperature instead of generating more by shivering or more active muscular activity. In extremely cold climates or in severe winter weather in temperate regions, a liberal supply of protein in the diet may promote physical comfort. On the other hand, in hot weather, especially with much humidity, dissipation of heat which the body is inevitably generating becomes difficult, and an extra supply of heat arising from a large amount of protein in the diet simply increases the difficulty of keeping comfortable, and may be a real menace to health. Furthermore, individuals differ in the ease with which they get rid of the surplus nitrogen. Sometimes large amounts of protein food, especially meats, tend to increase intestinal putrefaction and bring on a whole train of unfavorable symptoms; sometimes the kidney's powers are overtaxed, and certain compounds of nitrogen tend to accumulate in the body to its disadvantage. For such reasons, a moderate supply of protein, covering fully the needs for nitrogen, but not serving as the chief source of fuel, will produce the best results.

It is often convenient to express protein in terms of the total

day's fuel. An allowance of two protein calories per pound of body weight for an average man means about 300 protein calories per day. If this total energy requirement is 3000 calories, this means approximately 10 per cent of his fuel in the form of protein; if the total is 2500 calories, 12 per cent in the form of protein. Two and one-half calories per pound for a man consuming 3000 calories would mean about 15 per cent of his fuel as protein. A higher proportion results in more loss of heat from the stimulating power of protein, so that in general the body needs seem best met by supplying from 10 to 15 per cent of the total fuel in the form of protein, except when a man is in bed or when on a reducing diet, in which case care should be taken that he has at least two protein calories per pound regardless of the total energy intake. By reference to the dietaries already given it will be seen that the protein supply falls within the limits suggested here.

That proteins are composed of amino acids of different kinds, and that the nutritional efficiency of any particular protein or mixture of proteins is really a matter of just what amino acids it is capable of yielding, has already been pointed out in Chapter I. Fortunately, proteins are of many kinds, and usually several are associated in any single food. Cereal proteins *alone* do not yield a protein mixture which can be depended upon exclusively, but milk, eggs, and meat, each and all, make good any amino acid deficiencies in the cereal foods, even when used with them in rather small amounts. This is another reason why a pint of milk in the diet of an adult every day is a good rule.

Liebig, the first great student of protein in nutrition, thought that meat, being most like man's muscle, would be most efficient in replacing it. He had no idea that all proteins are literally taken to pieces in the digestive tract and all the parts (amino acids) reassembled by the cells according to their needs. Liebig's notion has been slow in giving way to the newer conception of the place of protein in nutrition, and many spend money in maintaining a traditionally high amount of meat in the diet who might be using their money to better advantage in obtaining a better supply of minerals and vitamins. The regard in which meat is held is

probably largely due to its peculiar texture and to certain substances found in its juices which give it a pronounced and agreeable flavor and exert a stimulating effect upon appetite and digestion. Meat agrees with the lazy eater who bolts his food, because it does not require mixing with saliva, being dissolved by the gastric juice of the stomach even if swallowed in comparatively large pieces. It also agrees well with the unskilled or careless cook, since it is acceptable even when badly treated whereas a delicately flavored vegetable may be utterly ruined by 2 minutes extra cooking or too much salt or even too much water.

As regards satisfying real body needs, meat proteins are by no means superior to all others. In fact, the proteins provided by nature for building body protein during the growth of the young are found in milk and eggs. The value of milk as a source of protein for growth cannot be disputed.

By reference to the table on page 17 it will be seen that 100 calories of lean round of beef will yield 55 protein calories. Six portions will, therefore, supply 330 protein calories, enough protein for an average-sized man for a day. But these 600 calories will cost 41 cents (with beef at 45 cents a pound in the market) and if his fuel requirement is 3000 calories, 2400 must still be bought to make up the day's total. If milk be selected, it will take 17 portions, costing 37.7 cents (with milk at 15 cents per quart), but leaving only 1300 calories to be obtained from other sources. If eggs are chosen, 9 portions will be required, costing 43 cents (with eggs at 40 cents a dozen), but requiring only 2100 calories to supplement those from protein. Milk and eggs are not only adequate substitutes for meat, but they carry in addition a rich supply of minerals and vitamins which will have to be added to the meat ration to make it equally valuable with either of the other two. The housewife who provides a somewhat varied diet, ample in fuel value, including milk and eggs, need not feel that she is depriving her family of any essential if she furnishes a very small amount of meat or none at all. One-fourth of a pound a day as an average for each adult man will provide approximately one-third of his protein requirement; bread, cereals, fruit, and green vegetables will furnish another third; and the remainder can be

obtained with little difficulty from a glass of milk, an egg, some cheese, beans, or nuts.

Requirements for Minerals

Attention has already been called in Chapter I to the importance of the mineral elements of food—how they enter into the structure of the skeleton and the soft tissues, and take a prominent part in the maintenance of life and health through the regulation of body processes. The results of mineral starvation would not be manifested so quickly as those of deprivation of water, fuel, protein (nitrogen) or some of the vitamins because the amounts lost daily are small and in an adult the reserves in the body are comparatively great. Studies of what men actually do eat reveal that the elements most likely to be taken in too small amounts for a good daily balance are phosphorus, calcium, and iron. A comparison of a reasonable supply of these elements for an adult with the amounts furnished by several combinations of food otherwise very excellent will show how mineral-bearing foods might be neglected (1 and 2 below), and how a single change will improve such food combinations (3 and 4 below). The quantities per day believed to be adequate for an average healthy man are as follows:

Phosphorus	1.32 grams
Calcium	0.67 gram
Iron	0.015 gram

(1) A ration of lean meat, white bread, and butter would be ample in protein and total fuel, but low in calcium.

	Weight Oz.	Protein Calories	Total Calories	Calcium Grams	Phosphorus Grams	Iron Grams
Bread, white (1¾ loaves)	20.7	216	1500	0.17[1]	0.53	0.005
Beef, lean	9.0	216	400	0.03	0.56	0.008
Butter	2.8	4	600	0.01	0.01	—
Total		436	2500	0.21	1.10	0.013

[1] Bread made with water and without special yeast food or improvers, which may increase the calcium considerably.

(2) A diet of white bread and milk would be adequate in protein and total calories, high in calcium and phosphorus, but poorly supplied with iron.

	Weight Oz.	Protein Calories	Total Calories	Calcium Grams	Phosphorus Grams	Iron Grams
Milk (7½ cups)....	61.2	228	1200	2.09	1.61	0.004
Bread, white (1½ loaves)...	17.9	187	1300	0.14[1]	0.46	0.005
Total.......		415	2500	2.23	2.07	0.009

(3) It is evident that the substitution of some milk in the bread-beef-butter diet will remedy its calcium shortage.

	Weight Oz.	Protein Calories	Total Calories	Calcium Grams	Phosphorus Grams	Iron Grams
Bread, white (1½ loaves)...	17.9	187	1300	0.14[1]	0.46	0.005
Beef............	6.8	163	300	0.02	0.44	0.006
Butter..........	2.3	3	500	0.01	0.01	——
Milk (2½ cups)....	20.4	76	400	0.70	0.54	0.001
Total.......		429	2500	0.87	1.45	0.012

(4) The second diet could be liberally supplied with iron by the simple expedient of substituting whole wheat bread for white.

	Weight Oz.	Protein Calories	Total Calories	Calcium Grams	Phosphorus Grams	Iron Grams
Milk (7½ cups)....	61.2	228	1200	2.09	1.61	0.004
Bread, whole wheat (1½ loaves).......	17.6	177	1300	0.26	1.09	0.013
Total.......		405	2500	2.35	2.70	0.017

[1] Bread made with water and without special yeast food or improvers, which may increase the calcium considerably.

If some foods known to be rich in iron, calcium, and phosphorus be included each day, the mineral elements will generally be adequately provided for, without detailed calculations like those just cited. Milk is the most valuable source of calcium; a single 100-calorie portion will supply one-fourth of the day's requirement. One portion of milk will also supply one-ninth of the day's phosphorus requirement. Eggs (especially the yolk), cereals from whole grains, lean meat, dried peas and beans, are desirable for their phosphorus content. With the exception of milk, the foods just named, liver and green vegetables, are rich sources of iron[1].

It has been found that traces of copper generally present in vegetables, fruits and whole grain cereals, enable the body to utilize iron better than it otherwise could. If one makes it a general rule to have a pint of milk (including that concealed in various foods by cookery) in the dietary program to insure the calcium and phosphorus supply, and adds some vegetable rich in iron daily, using eggs, meat (including liver), and cereals with the bran retained from time to time, but not necessarily all of them every day, there is little likelihood of the diet of the adult being deficient in mineral elements.

Vitamin Requirements

As already explained in Chapter I, each vitamin is a distinct chemical substance with its own particular functions in the body, hence we cannot speak of vitamin requirements in a general way any more than we can speak in that way of mineral requirements. But we can say, as in the case of the mineral elements, that when certain ones are provided by natural foods others needed will be furnished with them. The vitamins to which special attention will be given in discussing dietary problems in this book are vitamin A, vitamin B_1 (thiamin), vitamin C (ascorbic acid), and vitamin G (riboflavin).

Vitamin A

Vitamin A plays a very important part in the maintenance of the best health, since it is essential to the normal condition of the

[1] For calcium, phosphorus, and iron in various foods, consult Table I in the Appendix.

respiratory, genito-urinary and digestive tracts, the glands, the nervous system, the eyes, the teeth and the skin. It is fortunate that when the diet provides any surplus over immediate needs, it can be stored in the body, not only to sustain a high state of health, but to provide a valuable reserve for emergencies. The modern question is not "Have you had some vitamin A?" but "Are your vitamin A reserves adequate?"

Studies of vitamin A requirements of human beings have only begun, but the indications are that an adult man will be protected against any real deficiency by about 2200 international units daily. This amount will be provided by the inclusion in the daily diet of a pint of milk, an ounce of butter and a medium serving of a green leafy vegetable. To double this minimum requirement is highly desirable and when there is not too great necessity for economy, eggs, additional milk, butter and green or yellow vegetables will easily provide another 2200 units; but for those who wish to live as economically as possible and those on reducing diets, one of the simplest ways to insure adequate vitamin A is to supplement the diet with a small portion of cod or halibut liver oil. Since colds and other infections cause a considerable amount of the vitamin A eaten to be lost or to be ineffective, it is desirable to guard against any internal shortage by doubling the intake in seasons when colds are prevalent or when the body is suffering from any infectious disease, even though it be only a very mild one.

Vitamin B_1 (Thiamin)

Vitamin B_1 is essential at all times for the maintenance of good appetite and digestion, the normal combustion of carbohydrate food and the well-being of the nervous system, hence the adult as well as the growing child needs a liberal supply for the best health. In this country it is uncommon to find the disease known as beri-beri, which results from severe shortage of the vitamin, but minor gastro-intestinal diseases are all too prevalent and likewise minor disturbances of the nervous system commonly referred to as "neuritis". Many times these symptoms are quickly alleviated by an increased intake of vitamin B_1. Such experiences serve

as warnings that the person has been living on too low a nutritional plane as regards this dietary essential.

The Nutrition Commission of the League of Nations in its report on Physiological Bases in Nutrition[1], designed to serve as a general guide to an adequate diet, recommends for the adult at least 10 international units (30 micrograms) of vitamin B_1 for every 100 calories. Thus a man requiring 3000 calories would need 300 international units of vitamin B_1 daily.

The maintenance of this dietary standard necessitates the presence in the diet of some staple food or foods rich in the vitamin. In past ages, the foods which have served this purpose most generally have been the whole grain cereals and the legumes and it is the high milling of the cereals and the discarding of the legumes along with increased use of sugar and fats, both entirely devoid of vitamin B_1, which have brought the modern diet to a poor pass in this regard. Dr. Drummond[2] of University College, London, has pointed out that in Great Britain the diet provided for those under the Poor Law a century ago, wretched as it was from other points of view, being mainly bread, gruels and thin broths, gave the inmates no less than 1000 I.U. of vitamin B_1 per day, whereas at the present, analyses of British family food budgets indicate that the daily intake is between 200 I.U. for the lowest income levels and 500 I.U. for the highest. In this country, too, the U. S. Bureau of Home Economics has obtained figures quite similar to the British ones. Dr. Stiebeling, who has reported on the survey made by the Bureau says, "of the nutrients considered, protein appears to be the one most abundantly furnished with reference to need and calcium, iron and vitamin B_1, the least."

The recognition of this danger in the American diet is receiving very serious consideration and ere long this deficiency in the cereal foods most widely used by our population will be corrected in some way that will afford general protection. At the present time,

[1] League of Nations: "Report of the Technical Commission on Nutrition on Its Third Session, November 15-20, 1937," *Quart. Bull. Health Organization*, Vol. 7, p. 461 (1938).

[2] Drummond, J. C. and Wilbraham, A. *The Englishman's Food*, Jonathan Cape (1939).

Stiebeling, H. K.: "Nutritive Value of Diets of Families of Wage Earners and Clerical Workers in North Atlantic Cities," U. S. Dept. of Labor, Serial No. R 409.

vitamin B_1 is most economically obtained by the use of whole wheat flour and bread. One cent invested in whole wheat bread in New York City (the additional cost over the white loaf) will furnish an amount of vitamin B_1 which would cost at least 15 cents in other foods. The commercial preparation of cereals for ready-to-eat breakfast foods destroys much, if not all, of the vitamin B_1 originally present. Some manufacturers are already compensating for this by adding wheat germ or yeast or the pure vitamin to their products.

The maintenance of a high intake of vitamin B_1 requires the presence in the diet of some staple foods which are relatively rich sources. The whole grain cereals and the legumes are the only staple foods which may be counted in this class in the American dietary.

Egg yolk, liver and lean meat of pork, though more expensive are about as rich as the whole grain and legumes. Wheat germ and dried yeast, both baker's and brewer's, are the most outstanding natural food sources. Concentrates of yeast and rice bran sold under various trade names and the pure crystals of thiamin serve as excellent special sources when there is no great necessity for economy. In a moderately priced diet 300 vitamin B_1 units can be obtained from a pint of milk, 200 calories of whole grain bread, 100 of a home-cooked cereal which has not lost its vitamin B_1 in the process of manufacture, an egg, half a cup of tomato or orange juice, and 100 calories as potatoes (cooked in their jackets or steamed so that vitamin B_1 is not lost in the cooking water). Fruits and vegetables are not rich in vitamin B_1, and some vegetables lose a great deal in cooking, so that while they may serve as supplementary sources they should not be depended on exclusively. For those on reducing diets, who should eat very sparingly of cereals and breadstuffs, some special source of vitamin B_1 needs to be provided regularly in the diet.

Vitamin C (Ascorbic Acid)

Since the discovery of the chemical nature of vitamin C, it has been possible to develop laboratory tests for the amount present in the body of a man and thus to find out whether his tissues are

well-stocked or not. Thus a group of students whose blood was tested while on their usual diet were each given a pint of orange juice daily for a week and again tested. Those with an initially high level of vitamin C in the blood, indicating a diet which was adequate, showed little or no increase after the week of high vitamin C feeding, but those with low values, corresponding to a poor supply in the customary diet, were convicted of their dietetic sin by the marked increase of their blood values for vitamin C. By many measurements of the vitamin C reserve of men and animals it has become increasingly clear that much more is needed to maintain the best health than to prevent symptoms of scurvy. Infections even though mild greatly increase the need for it. It has been found that in case of various minor disturbances of the respiratory tract and in fevers a larger supply is needed to maintain the body reserves at a high level than when the person is in perfect health.

The Nutrition Commission of the League of Nations, already referred to on page 127, considers the adult man's daily requirement covered by about 600 international units or 30 milligrams of pure ascorbic acid. This is to be regarded as a minimum for safety, to be doubled whenever possible.

In many foods vitamin C is so easily destroyed by heating, ageing or drying that it is often difficult to know whether the food one is eating has any vitamin C or not. Much can be done to conserve vitamin C values by eating vegetables freshly picked and raw or by cooking them quickly and not throwing away the cooking water, but it is more satisfactory to have in the dietary some regular source of vitamin C which is thoroughly dependable, and to count whatever is present in other foods as so much extra "health insurance." The practice of canning citrous fruit juices and tomato juice for the market makes them available almost everywhere at all times at a moderate cost. Half a glass (four ounces) of orange or grapefruit juice or a full glass (eight ounces) of tomato juice will meet a man's minimum requirement for vitamin C. The daily use of potatoes, a fresh raw vegetable and a fresh raw fruit will add the desirable margin of safety.

Vitamin D

The construction of bones and teeth, so rapid in infancy, is to all outward appearances at a standstill in adult life. But bones and teeth are living tissues and throughout life their best maintenance demands not only calcium and phosphorus but also vitamin D to aid in their utilization. In climates where brilliant sunshine is rare or prevalent only at certain seasons, adults occupied inside buildings most of the time may be exposed very little to direct sunshine and should have some vitamin D regularly in their diets. If a teaspoon of cod liver oil or a halibut liver oil capsule is taken for vitamin A, some vitamin D will be obtained too. The most advantageous amount of vitamin D for adults has not yet been studied, but the use of diets ample in calcium and phosphorus, with some regular source of vitamin D may be confidently expected to reduce the number of older people with porous and fragile bones.

Vitamin G (Riboflavin)

Quantitive studies of the vitamin G requirement of man have only recently engaged the attention of investigators, and most of our knowledge of the importance of this vitamin in nutrition has come through research on animals, reinforced by a few studies of human beings. In one such study, ten women developed typical symptoms of soreness about the mouth after three or four months on a diet known to be low in vitamin G and were promptly cured by administration of pure riboflavin. There is a marked storage of the vitamin in the liver and kidney, and the body tends to conserve its vitamin G in face of shortage, so that signs of deficiency develop slowly and their cause has in the past been quite unsuspected. Experiments with animals through many generations show that there is a distinct improvement in vigor and a prolonging of the prime of life when the daily intake is at least four times as much as will maintain apparently normal health.

Present estimates of vitamin G requirements are based on dietary studies of many people in various economic levels. They indicate that it is desirable for the adult man to have about 20

Bourquin-Sherman units (approximately 60 micrograms of riboflavin) per 100 calories, or about 600 Bourquin-Sherman units per day.

One of the most important sources is milk, and the pint which should be taken to insure adequate calcium will at the same time furnish about a fourth of the day's requirement for vitamin G. A potato, white or sweet, and a liberal serving of a green vegetable will together furnish another fourth. Three ounces of meat and an egg will bring the total to three fourths of the day's allowance, and generous servings of fruits and of other vegetables may be expected to make up the last quarter.

Fish muscle is a poor source in comparison with beef and chicken. Beef liver is ten to fifteen times as rich as beef muscle. Dried brewer's yeast is weight for weight of the same high value as liver. In the very economical diet, the best sources to depend on are milk, dried peas and beans and green leafy vegetables.

Chapter VI

FOOD FOR THE ADULT WOMAN

Energy Requirement

HOWEVER much civilization may tend to emphasize certain physiological and psychological differences between men and women, when we come to study their essential food needs we find that the laws of energy exchange are practically the same for both sexes. Respiration, circulation, digestion, and muscular tension,—all forms of internal body work—demand their daily quota of fuel; the larger the body, the more fuel required to run it; the more external work done by the human machine, the more fuel demanded for this purpose.

In actual comparisons between living men and women, we recognize that men as a class are larger and heavier than women; they also tend to have a higher muscular development and to carry on more severe muscular work; wherefore the common notion that men as a rule eat more than women is true. But when we compare men and women of the same height and weight, lying at rest so that differences in external activity are excluded, we find women requiring about fourteen per cent less calories than men. Women as a class tend to have more body fat in proportion to their weight, which reduces the amount of active working muscle. If, however, a man and a woman do the same kind and amount of work, the expenditure of energy to accomplish the task will be as great for the woman as for the man. We shall not fall into any serious error then in applying to women the same table already used for calculating the fuel requirements of men. Adjustments can be readily made for differences in the amount and kind of activity. Women's tasks have been lightened by modern household machinery and the amount of time which many of them spend in vigorous exercise is comparatively small.

Kind of Activity	Calories per Pound per Hour
Sleeping	½
Sitting (reading, hand or power machine sewing, knitting, writing)	⅗
Standing	¾
Light exercise (dishwashing, cooking for 2–4 persons, bed making, sewing with foot power)	1
Moderate exercise (cooking for 6–12 persons, sweeping, ironing, scrubbing by hand)	1¼–1½
Active exercise (cooking for large groups, ironing, scrubbing with heavy implements, etc.)	1¾–2

Taking the weight of the average woman as 123 pounds, we may estimate the energy requirement of a housekeeper doing all but the washing and heavy cleaning for a family of five as follows:

Calculated Energy Requirement for Twenty-four Hours for a Moderately Active Woman Weighing 123 Pounds

Activity	Hours	Calories
Sleeping	8	492
Sitting	5	369
Standing	2	185
Light exercise	6	738
Moderate exercise	3	461
Total	24	2245

The daily requirement for the average woman in some of her common occupations will be approximately as follows:

1. At rest .... 1600–1800 Calories per day
2. Sedentary occupations .... 2000–2200 Calories per day
   - Milliners
   - Bookkeepers
   - Stenographers
   - Teachers
   - Seamstresses
   - Machine operatives
3. Occupations involving standing, walking, or manual labor .... 2200–2500 Calories per day
   - Cooks in family groups
   - General housekeepers
   - Chamber maids
   - Waitresses
4. Occupations developing muscular strength .... 2500–3000 Calories per day
   - Laundresses
   - Cooks for large groups

Women's appetites tend to be more fickle than men's, perhaps partly due to the fact that in the past they have not had very high ideals of health and have not made themselves lead such lives and choose such food as to produce good steady appetites. They have stayed too much indoors, taken too little systematic exercise and rest, and been confined too closely to one environment, to get that nervous and muscular poise which brings good tone to the alimentary tract and hence a healthy appetite. Eating is primarily a duty; nature has graciously made it also a physiological and social pleasure for most people; but whether she has or not, the duty remains, and science steps in to guide when the palate fails as a monitor of health. For women perhaps more than for men is appetite apt to be perverted and a knowledge of food values of constant practical use.

Protein, Mineral and Vitamin Requirements

There appears to be no difference in the vitamin needs of the sexes with the exception of the extra demands of maternity. A pint of milk, a portion of butter or a butter substitute with added vitamin A to make it the equivalent of butter in this respect, an egg and a portion of a leafy or yellow vegetable will provide enough to protect against deficiency, and as an extra safeguard, a teaspoonful of cod liver oil or a halibut liver oil capsule is to be highly recommended. When great economy is necessary, the cod liver oil will prove a cheap source of the major part of the vitamin A supply.

For vitamin B_1, a pint of milk, an egg, a serving of leafy or yellow vegetable, which serve as "protecting" sources of vitamin A will also contribute about one-fifth of the day's requirement of 10 international units per 100 calories. If two or three additional portions of fruits and vegetables are eaten, and one serving of lean pork or of a whole grain cereal which has not been heated sufficiently to destroy the vitamin B_1, the day's requirement will in all probability be met, but without much margin of safety. For the best protection the use of at least 100 calories of whole wheat bread or a portion of bran or wheat germ or yeast extract is highly desirable. There is no dietary essential except calcium

that is so likely to be dangerously low in an apparently good diet as vitamin B_1 and any shortage is so quickly reflected in poor appetite and less efficient digestion and elimination that every care should be taken to see that the supply of this vitamin is generous.

Vitamin C is best guaranteed by a daily portion of some food known to be especially rich in this substance, as one of the citrus fruits (oranges, grapefruits, tangerines) or tomatoes. In addition, for the best protection, a daily serving of a raw green vegetable, such as cabbage, carrots or lettuce, or of a cooked one so rich in vitamin C that much remains when it comes to the table, as quickly cooked green peas, spinach or potatoes, should be a regular part of the program.

Vitamin D should be obtained in sunny weather largely if not entirely by direct exposure of the skin to sunshine, but in cloudy seasons, a special source is advisable, and if cod liver or halibut liver oil is being taken for vitamin A, the vitamin D requirement will be met at the same time.

Fortunately, many of the foods which provide the vitamins already mentioned are also good sources of vitamin G, though no one provides a large amount. A pint of milk, a green vegetable, an egg, and a serving of lean meat will contribute the main part of the day's supply, with small amounts from other fruit and vegetables. When great economy is necessary, milk may be supplemented by yeast or yeast extract.

The following food plans and dietaries are suggestive of ways of supplying suitable fuel for active and sedentary women. They are also arranged with a view to insuring an adequate supply of proteins, minerals, and vitamins.

A Day's Food Plan for an Active Woman

Fuel Requirement: 2600–3000 Calories — Cost: 2½–3¢ per 100 Calories

Breakfast:	Fresh or stewed fruit or fruit juice	50–100 Calories
	Cereal	50–100 Calories
	Milk	100–300 Calories
	Cream or top milk	100–200 Calories

Breakfast:—(*Continued*)		
	Creamed dried beef or Fish balls or Eggs	100–200 Calories
	Toast or muffins	50–150 Calories
	Butter or butter substitute with vitamin A	50–150 Calories
	Sugar	50–150 Calories
	Coffee	— —
		600–900 Calories
Luncheon:	Thick vegetable soup with crackers or Cheese or nut salad or Scalloped eggs and tomatoes or Cold meat and potatoes	250–400 Calories
	Bread	100–200 Calories
	Butter or butter substitute with vitamin A	100–200 Calories
	Canned, dried, or fresh fruit with cake	200–400 Calories
	Milk	85–170 Calories
		800–1200 Calories
Dinner:	Soup with rice, noodles, or vegetables	25–100 Calories
	Roast rump of beef or Mutton or Pork chop	200–350 Calories
	Potatoes or macaroni	150–250 Calories
	Boiled onions or other seasonable vegetable	150–200 Calories
	Simple vegetable salad or Celery or Olives	50–150 Calories
	Bread	50–200 Calories
	Butter or butter substitute with vitamin A	50–200 Calories
	Fruit gelatin or Tapioca cream or Fruit pie	200–400 Calories
		900–1400 Calories

A DIETARY FOR AN ACTIVE WOMAN, BASED ON THE PRECEDING PLAN

I

Fuel Value: 2885 Calories — Cost: 2½–3¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
BREAKFAST:				
Canned orange and grapefruit juice (C, B_1, G)	½ cup	3.7	2	50
Cornflakes	⅜ cup	0.5	3	50
Milk (A, B_1, G)	1 cup	8.5	34	170
Cod fish balls (B_1, G)	1 ball 2 in. diam.	1.7	14	100
Toast	2 slices 3 in. x 3½ in. x ½ in.	1.1	14	100
Sugar	1 tbsp. (scant)	0.5	—	50
Butter (A)	1 tbsp.	0.5	1	100
Cream, thin (A)	¼ cup (scant)	1.8	5	100
Coffee	1 cup	—	—	—
				720
LUNCHEON:				
Cheese souffle (A, B_1, G)	¾ cup	2.5	27	150
Turkish pilaf (C, B_1, A)	1 cup	7.5	9	100
Corn muffins (A)	2 small	2.4	26	200
Butter (A)	1 tbsp.	0.5	1	100
Canned apricots (A)	3 large halves, 2 tbsp. juice	4.8	5	100
Chocolate loaf cake	piece 2½ in. x 2½ in. x 1¾ in.	1.8	10	200
Milk (A, B_1, G)	1 cup	8.5	34	170
				1020
DINNER:				
Vegetable soup	¾ cup	6.0	18	25
Pork chops, broiled (B_1, G)	1 large	3.0 lean meat	80	250
Glazed sweet potatoes (A, B_1)	2 halves	5.2	10	250
Mashed turnips (C, B_1, G)	⅔ cup	5.4	7	50
Cole Slaw (C, B_1, A, G)	½ cup	1.4	3	50
Rolls	2 small	1.5	15	120
Butter (A)	1 tbsp.	0.5	1	100
Apple tapioca	⅜ cup	5.4	2	150
Cream sauce (A)	¼ cup	1.7	5	150
				1145
Total for day			326	2885

A DIETARY FOR AN ACTIVE WOMAN, BASED ON THE PRECEDING PLAN

II

Fuel Value: 3005 Calories — Cost: 1¾–2¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Sliced banana (B_1, A, C,)	1 medium	3.6	5	100
Shredded wheat biscuit (B_1)	1 biscuit	1.0	14	100
Milk for cereal (A, B_1, G)	1 cup	8.5	34	170
Top milk for coffee (A, B_1, G)	⅜ cup	3.0	10	100
Sugar for cereal and coffee	2 tbsp. (scant)	0.9	—	100
Date muffins (whole wheat and dates (A)	2 small muffins	2.4	18	200
Butter substitute with vitamin A (A)	1 tbsp.	0.5	1	100
				870
Luncheon:				
Creamed salmon and peas on toast (A, B_1, G)	½ cup salmon and peas, 1 slice toast	4.7	43	200
Baked potatoes (B_1, C)	1 medium	3.0	11	100
Bread, whole wheat (B_1)	2¼ slices, 3¾ in. x 3 in. x ¼ in.	2.1	24	150
Butter substitute with vitamin A (A)	1½ tbsp.	0.8	2	150
Red cabbage salad (C, B_1)	¾ cup	2.8	4	100
Canned peaches (A, C)	2 large halves and 3 tbsp. juice	7.5	6	100
Cookies	2, 2¼ in. diam.	0.9	6	100
Milk (A, B_1, G)	½ cup	4.3	17	85
				985
Dinner:				
Broiled Hamburg steak with gravy (G)	1 ball 2⅔ in. diam. ¾ in. thick, 2⅔ tbsp. gravy	4.6	76	200
Escalloped potatoes (B_1, C)	1¼ cups	7.0	18	200
Fried parsnips (B_1)	7 pieces, 3½ in. x 1½ in. x ⅓ in.	5.0	10	100
Apple sauce (B_1, C)	⅜ cup	3.5	1	100
Lettuce, with salt, sugar, lemon juice (A, B_1, C, G)	3 or 4 large leaves	2.0	3	10
Bread, white	2 slices 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter substitute, with vitamin A (A)	1 tbsp.	0.5	1	100
Blueberry pie	piece 4½ in. at circumference	4.8	9	340
				1150
Total for day			327	3005

A Day's Food Plan for a Sedentary Woman

Fuel Requirement: 1800–2300 Calories | Cost: 2½–3½¢ per 100 Calories

Breakfast:	Fruit	100 Calories
	Wheat germ	50 Calories
	Cereal or omelet or bacon	50–100 Calories
	Toast or muffins	50–200 Calories
	Butter	33–100 Calories
	Coffee with cream and sugar or milk or café au lait or cocoa	100–200 Calories
		400–600 Calories
Luncheon:	Cream soup or creamed meat on toast or macaroni croquettes, cheese sauce or egg, fish, or cheese salad	150–250 Calories
	Rolls	100–150 Calories
	Butter	50–100 Calories
	Fruit	100–150 Calories
	Cocoa or milk	150–175 Calories
		600–800 Calories
Dinner:	Soup	25–100 Calories
	Croutons or crackers	25–50 Calories
	Roast beef or Nut loaf or Meat pie	150–300 Calories
	Potatoes or Rice or Baked banana	100–150 Calories
	Spinach or other green vegetable	10–50 Calories
	Crackers or bread and butter	15–50 Calories
	Lettuce, tomato, or other simple salad	75–150 Calories
	Sherbet or Custard or Fruit jelly or whip	200–300 Calories
		800–1100 Calories

A Dietary for a Sedentary Woman, Based on the Preceding Plan

I

Fuel Value: 2074 Calories Cost: $2\frac{1}{2}$–$3\frac{1}{2}$¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Orange (C, B_1, G)	1 orange	9.5	7	100
Wheat germ, granular (B_1, G)	2 tbsp.	0.4	14	50
Omelet (A, B_1, G)	1 egg	2.0	28	100
Toast	1 slice 3 in. x $3\frac{1}{2}$ in. x $\frac{1}{2}$ in.	0.5	7	50
Butter (A)	1 tsp.	0.1	—	30
Cocoa I[1] (A)	¾ cup	6.7	16	120
				450
Luncheon:				
Corn a la Southern (A)	½ cup (scant)	4.2	20	125
Fruit salad I[1] (C, B_1) (mayonnaise)	½ cup	3.0	6	200
French rolls	1 roll	1.3	12	100
Butter (A)	2 tsp.	0.3	—	67
Milk (A, B_1, G)	¾ cup	6.3	24	128
Peanut cookies	2 cookies, 2 in. diam.	1.0	12	114
				734
Dinner:				
Cream of pea soup (B_1, A)	⅔ cup	5.2	16	100
Croutons, fried	½ doz.	0.4	3	50
Lean roast beef (G)	$1\frac{1}{2}$ slices 5 in. x 5 in. x ⅛ in.	2.4	69	150
Baked potato (C, B_1)	1 medium	3.0	11	100
Spinach à la crême (A, B_1, C, G)	⅓ cup (scant)	1.8	4	45
Carrot and orange salad (A, B_1, C, G)	1 serving	8.0	8	175
Saltines	1 saltine	0.1	1	15
Tapioca cream (A, B_1, G)	1 cup	7.3	30	255
				890
Total for day			288	2074

[1] See Table II, Appendix.

A DIETARY FOR A SEDENTARY WOMAN, BASED ON THE PRECEDING PLAN

II

Fuel Value: 2062 Calories Cost: 1¾–2¢ per 100 Calories

MEAL	MEASURE	WEIGHT OZ.	PROTEIN CALORIES	TOTAL CALORIES
BREAKFAST:				
Orange (C, B_1, G)	½ orange	4.7	3	50
Oatmeal, cooked (B_1)	¼ cup	2.4	8	50
Wheat germ, flaked (B_1, G)	3 tbsp.	0.4	14	50
Cornmeal muffins (A)	1 small	1.2	13	100
Butter substitute with vitamin A (A)	2 tsp.	0.3	—	67
Milk, top for coffee—rest for cereal (A, B_1, G)	1 cup	8.5	34	170
Sugar	1 tbsp.	0.6	—	60
Coffee	1 cup	—	—	—
				547
LUNCHEON:				
Cheese sauce and tomatoes on toast (C, A, B_1)	½ cup each and 2 slices	11.3	49	325
Bread	1 slice 3 in. x 3½ in. x ½ in.	0.7	7	50
Butter (A)	½ tbsp.	0.2	—	50
Apple sauce	⅜ cup	3.5	1	100
Sponge cake (A)	piece 1½ in. x 1½ in. x 2 in.	0.9	11	100
Cocoa II (A, B_1, G)	¾ cup	6.3	29	180
				805
DINNER:				
Stuffed steak (G)	slice 3 in. diam. ⅔ in. thick	3.4	78	200
Cabbage and apple salad (C, B_1, A)	1 serving	3.2	5	100
Browned potatoes (C, B_1)	1 medium potato	3.5	11	125
Boiled onions (C)	2 onions	5.0	9	75
Bread	1 slice, 3 in. x 3½ in. x ½ in.	0.7	7	50
Butter (A)	½ tbsp.	0.2	—	50
Coffee jelly	½ cup	4.0	4	40
Whipped cream (sweetened) (A)	1½ tbsp.	0.7	1	70
				710
Total for day			284	2062

Overweight Women

To eat out of proportion to one's need either on the side of meagerness or superfluity is culpable in the light of modern knowledge. A witty writer who applied herself to the problem of reducing her weight testified thus: "I removed 50 pounds in seven months, and this without exercising anything but my intelligence." This means that she was able to make her food intake less than her energy expenditure and burn off her superfluous fuel. A pound of body fat means 4000 calories which have been taken in excess of need. The only way to get rid of that extra pound is to create a discrepancy between food intake and energy output. One may do it by increasing the output—exercising something more than one's intelligence—but that will tend to increase appetite, and then it becomes harder than ever to keep one's food consumption under restriction. So for most overweight persons, it is more practical to take only one "daily dozen" instead of five or six—just enough to keep the muscles in good tone; and to restrict the calories in the food so that the proper weight is established and maintained. For women, as for men, the normal weight at thirty is regarded as the most favorable to health in subsequent years. (See Table V in the Appendix.) Those who inherit a propensity to store body fat very easily may even have to be on guard before thirty, but most women begin to manifest this tendency after rather than before this age. The time to begin to adjust the diet is when the tendency to store fat begins to appear. Once "great excess" has accumulated, the problem of its removal without harm becomes more complicated; severe reducing should be carried on only under the supervision of a physician who can regulate the treatment so that the general health is not impaired. Sudden loss of pounds of supporting fat leaves weakened muscles unfavorably situated to grow vigorous again. Building up must in this case accompany burning away supporting pads of fat. A wise woman will not let her body become encumbered with too much fat, but will check her weight on the scales at least every month or two and immediately proceed to curb any tendency for appetite to take on more than activity works off. In the early stages of growing fat, "counting the

calories," with care that the other essentials of the diet are at the same time fully provided, will result in better health and longer enjoyment of it. Mr. Henry T. Finck, the well-known musical critic, who wrote for the benefit of mankind his facetious yet earnest "Girth Control," puts the situation very aptly, quoting Shakespeare thus:

> "Make less thy body hence and more thy grace;
> Leave gormandizing; know the grave
> Doth gape for thee thrice wider than
> For other men."

Then he asks, "How could Shakespeare, so many years ago anticipate the latest life insurance figures? . . . What are the insurance companies' figures? They show that when you are about fifty years old every pound of overweight means 1 per cent taken from your life expectancy. If at fifty you weigh 50 pounds too much, your life expectancy is reduced by 50 per cent—that's easy to remember.

"In other words you will live only half as many years more as you would if you enjoyed normal weight. *Keep that fact before you every time you sit down to eat.*"[1] In the diet lies the only real solution of the fat problem. Yet many women believe that some panacea can be found which without any effort on their part can transform them into girlish slimness practically overnight. Practically all so-called "cures" either contain dangerous drugs or are simply shrewd schemes for fooling the gullible. If the latter "work" it is because somehow or other they induce the one taking the cure to eat less calories than she spends. How much better, then, to reduce by "exercising one's intelligence!" In a study of overweight college women made at the University of Illinois, it has been found that it is often necessary to reduce the total calories per day to 1000 or less in order to bring about satisfactory loss of weight, but that it can be done with no injury to health or efficiency if the person lives a well-regulated life, with suitable sleep, fresh air and exercise, and eats a diet which is adequate in every other dietary essential except calories. The best way for an individual to proceed is to find out from Table V in the Appendix

[1] Italics not in the original text.

her normal weight for height using figures for age 30 if above that, and then estimate her requirement per day as indicated on page 133. Suppose her normal weight to be 145 pounds, and her occupation sedentary, then her total requirement would perhaps be 2300 calories per day. But her actual weight is 195 pounds and since so much of it is mere fat, 2300 calories may be actually enough to maintain it. Hence to lose anything at all she must cut her intake down to a total of not over 1800 calories per day. With a reduction of only 500 calories per day it may take a whole year to get rid of 50 pounds, but "slow and sure" is a good rule in reducing. The food plan and dietary which follow indicate the general character of such a program.

A Day's Food Plan for a Reducing Diet for an Overweight Woman

Fuel Requirement: 900–1200 Calories
Ordinary Requirement: 2400–2600 Calories Cost: 2½–3½¢ per 100 Calories

Breakfast:	Fruit or fruit juice, unsweetened	50–100 Calories
	Wheat germ	50 Calories
	An egg (or ½ cup skim milk)	60–75 Calories
	Toast or bran bread	50 Calories
	Milk (with or without coffee)	40–50 Calories
	Coffee (if desired)[2]	— —
	Halibut liver oil capsule	— 2 Calories
		200–300 Calories
10:30 a.m.:	Tomato or vegex bouillon	— —
	Bran or cellu wafer[1] or water cracker	0–10 Calories
Luncheon:	Lean meat or fish or skim milk cheese	100–200 Calories
	Lettuce or other raw vegetable salad, mineral oil dressing[1]	25–50 Calories
	Whole wheat or bran bread	50–75 Calories
	Butter	50–75 Calories
	Milk (can be postponed to 10:30 p.m. if desired)	85 Calories
		300–400 Calories
4:00 p.m.:	Tea with lemon[2]	— —
	Bran or cellu wafer	0–5 Calories
Dinner:	Lean meat or fish or oysters	150–250 Calories
	Potato or carrots or peas	50–75 Calories
	Cooked leafy vegetable	15–30 Calories
	Butter	25–50 Calories
	Raw vegetable salad, mineral oil dressing[1]	25–75 Calories
	Fresh raw fruit (no sugar)	50–75 Calories
	Coffee (if desired)[2]	— —
		350–500 Calories

[1] No food value.
[2] Saccharine may be used for sweetening.

100-Calorie Portions of Salads and Salad Accessories

Food Material	*Measure*
Tomato stuffed with tuna fish and celery	One medium tomato, ¼ cup filling, no dressing
Water cress salad....................	1½ oz. cress, 1⅛ tbsp. French dressing
Tomato and cucumber salad..........	½ tomato, 3 slices cucumber, ⅞ tbsp. mayonnaise
Crackers, whole wheat	18 crackers 1½″ diam.
Pineapple and cream cheese salad......	1 slice pineapple, 1 tbsp. cheese, no dressing
Graham crackers....................	3 crackers 2½″ x 2½″ x ⅛″
Jellied fruit salad..................	1 cup, no dressing
Crackers, cream....................	3 crackers 2½″ diam.
French dressing......................	1½ tbsp.
Russian dressing.....................	1¼ tbsp.
Mayonnaise dressing................	1 tbsp.
Melba toast..........................	6 slices 1½″ x 3½″ x 3/16″

A Reducing Diet Suggested for an Overweight Woman

Fuel Value: 1032 Calories

Ordinary Requirement: 2400 Calories — Cost 2½–3½¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Apple (C, B_1)	1 small	4.9	2	65
Egg (A, B_1, G)	1 egg	2.0	27	75
Toast	1 slice 3 in. x 3½ in. x ½ in.	0.7	7	50
Coffee[1]	1 cup	—	—	—
Skim milk (B_1)	½ cup	4.3	16	45
Halibut liver oil (A)	1 capsule	—	—	2
				237
10:30 A.M.:				
Vegex bouillon (B_1)	1 cup	8.0	—	—
Water cracker	1 cracker	0.1	1	10
				10
Luncheon:				
Lean cold pot roast of beef (G)	slice 5 in. x 5 in. x ½ in.	2.4	92	150
Whole wheat bread (B_1)	2 slices 3½ in. x 2¾ in. x ¼ in.	0.7	7	50
Lettuce and cottage cheese salad				
Lettuce (C, A, B_1, G)	ad libitum			
Cheese (B_1)	1¾ tbsp.	—	27	35
French mineral oil dressing	ad libitum			
				235
4:30 P.M.				
Tea with lemon[1]	1 cup	—	—	—
Bran wafer	1 wafer	0.1	1	10
				10
Dinner:				
Boiled cod with lemon (G)	large serving	8.0	188	200
Boiled potato (C, B_1)	½ medium	1.8	6	50
Cauliflower (plain) (B_1, C, G)	large serving	2.3	6	20
Butter (A)	1 tsp. (scant)	0.1	—	30
Watercress and egg salad				
Watercress (C, A, B_1, G)	ad libitum			
Egg (A, B_1, G)	1 egg	—	27	75
French mineral oil dressing	ad libitum			
Orange (C, B_1, G)	1 medium	7.6	6	80
Black coffee	demi-tasse	—	—	—
				455
10:30 P.M.:				
Hot whole milk (A, B_1, G)	½ cup	4.3	17	85
Total for day			430	1032

[1] Saccharine may be used for sweetening.

It is most important to work out a plan which can be remembered and stick to it. For some it is easier to omit one meal a day; others suffer less from hunger if they eat more frequently but less at a time. The essential thing is to see that no more than the predetermined number of calories are eaten on any day—not excepting Sundays, holidays, or afternoon teas—and that protein, minerals and vitamins be taken in the same amounts needed if one were not on a reducing diet.

Tomato and grapefruit juices, used freely, will provide vitamin C with negligible calories. Green vegetables twice daily make good filling for an empty stomach and help to insure high vitamin A and iron values. At least one cup of skim milk is required for its calcium and vitamin G, and lean meat twice daily guarantees adequate protein. Some special source of vitamin B_1 must always be included.

Underweight Women

Women of nervous temperament are apt to be too thin. They expend much energy in heightened muscular tension, while nervous disturbances quickly react on the alimentary tract making it difficult to take or digest sufficient food. Only an intelligent persistence in taking regularly a supply of food in excess of immediate needs will result in a gain of weight. The removal, as far as possible, of causes of nervous excitement or irritation and avoidance of much muscular exertion, limiting exercise to the lighter forms, are great helps in adjusting the balance between intake and outgo of energy. Long hours of sleep not only conserve energy at the time but tend to decrease nervous tension during the waking hours. Experimental studies have shown that under-nutrition of itself tends to stimulate activity, so that rest and food both are necessary for getting an energy balance favorable to the individual.

To be more than ten per cent under weight for one's height usually means lessened physical efficiency.[1] This is not always realized by any means. Studies of under-weight college women have shown that they regarded themselves as well, and were

[1] See Appendix, Table V, Height and Weight for Women at Different Ages.

quite surprised at how much more buoyant they felt, and how much less easily fatigued, when they began to gain in weight.

Food must be taken by measure rather than by appetite, but liberal use of vitamin B_1 will improve both appetite and digestion, so that what is a great effort at first will become easier later on. At first, one or two tablets of pure vitamin B_1 (thiamin) of one milligram each may be helpful, but wheat germ and yeast extract are easy to take and rich in the vitamin. At the same time it is wise to choose food which will digest with the greatest ease. Fluid foods are most easily taken when appetite fails, and make practical additions to the usual diet. Milk, which is so valuable a food, can be taken in many forms: hot, cold, with added cream or milk sugar, or both; in cocoa and chocolate; in sherbets and ice creams; as malted milk, buttermilk, zoolak, or koumiss; so that it is one of the easiest foods to add to the diet. Fruit juices from sweet fruits, or with their fuel value increased by the addition of milk sugar, make agreeable and nutritious beverages. Raw eggs are easily swallowed and give a good return for the effort made, whether taken plain or modified by being beaten up with milk, cream, or fruit juice. The idea that raw eggs are not well digested has been refuted by careful experiments on human beings which showed that raw whites (the part in question) are almost as completely digested as cooked ones. A little study of food values should make it possible to find acceptable ways of increasing the food intake. Three glasses of milk, added to the regular diet, will mean an increase of 500 or more calories; an extra pat of butter taken at each meal will add 300 calories; a teaspoonful of cod liver oil daily will not only add calories, but also vitamins A and D to increase the vigor of the tissues; a piece of sweet chocolate giving 200 calories may be a welcome after-dinner tit-bit or a dozen almonds may supply 100 calories that otherwise would not be eaten. Very often the easiest way to increase the food intake is by one or two additional meals, *e.g.*, mid-morning and mid-afternoon lunches, or a morning lunch and a glass of milk or other nourishing beverage just before going to bed. This is especially true for women whose work is exhausting, so that they come to their regular meals "too tired to eat." It is hard to fatten an

overworked person, and rest should be sought—long hours of sleep at night and a short period of lying flat and relaxed (if only ten minutes) in the middle of the day; but even a slight surplus of food over immediate needs, if persistently taken, will in time have its favorable effect on the general health and especially on the nervous system. To get the best results, considerable increases in the food intake should be maintained over a long time, with enough sunshine, fresh air, and exercise to promote good appetite and digestion. One example of a fattening diet has already been given;[1] others, approximating a little more closely the average requirement of a woman, are presented on the following pages.

A Day's Food Plan for a Fattening Diet for a Thin Woman

Fuel Requirement: 3000–3200 Calories
Ordinary Requirement: 2400–2600 Calories — Cost: 2½–3¢ per 100 Calories

Breakfast:	Fruit or fruit juice	100–150 Calories
	Whole grain cereal or cereal with wheat germ	75–100 Calories
	Egg, bacon, or chop	70–100 Calories
	Toast, muffin, or roll	100–150 Calories
	Butter	100–150 Calories
	Cream, thin	200–300 Calories
	Sugar	50–100 Calories
	Coffee (if desired)	— —
		800–900 Calories
10:30 a.m.:	Hot milk, flavored with cocoa, malted milk, or postum	150–250 Calories
Luncheon:	Hot cooked vegetable with cream or butter	100–200 Calories
	Fruit salad or stewed fruit	100–200 Calories
	Roll or triscuit	75–100 Calories
	Butter	75–150 Calories
	Custard or gelatin jelly or plain cake	150–200 Calories
	Cream or milk for dessert	100–200 Calories
		800–1000 Calories
4:00 p.m.:	Hot weak tea with milk or lemon and sugar Sandwich or crackers or Eggnog or buttermilk or pineapple juice	100–200 Calories
Dinner:	Stuffed steak with gravy or fish with egg sauce	150–250 Calories
	Potatoes, mashed, scalloped, hashed in cream	150–200 Calories
	Cooked vegetable with cream or butter	50–100 Calories
	Raw vegetable or fruit salad, cream or mayonnaise dressing	100–200 Calories
	Nuts, plain or salted or jelly or jam	100–150 Calories
	Ice cream or pudding	200–300 Calories
		900–1100 Calories

[1] See page 107.

A Fattening Dietary Suggested for a Thin Woman

Cost Liberal

Fuel Value: 3050 Calories
Ordinary Requirement: 2400 Calories — Cost: 2½–3¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Prunes (A, G, B_1)	4 medium	1.4(dry)	3	100
Grapenuts	¼ cup	1.0	12	100
Wheat germ (B_1, G)	2 tbsp.	0.4	14	50
Egg (A, B_1, G)	1 egg	1.9	25	70
Toast	2 slices 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter (A)	1 tbsp.	0.5	1	100
Cream, thin (A)	¾ cup	5.4	15	300
Sugar	1 tbsp. (scant)	0.5	—	50
Coffee	1 cup	—	—	—
				870
10:30 A.M.:				
Cocoa III[1] (A, B_1, G)	⅘ cup	7.6	32	250
Luncheon:				
Corn chowder (A, C)	⅗ cup	5.0	18	150
Fruit salad I (B_1, C)	1 serving	3.0	6	200
Whole wheat roll (B_1)	1 roll	1.3	12	100
Butter (A)	1½ tbsp.	0.7	1	150
Chocolate blanc mange with	½ cup	3.9	16	200
whipped cream (A)	3 tbsp.	0.9	2	100
				900
4 P.M.:				
Egg in orange juice (A, B_1, C, G)	1 egg, 3 tbsp. juice, 2 tsp. sugar	4.2	25	130
Dinner:				
Broiled steak (G)	piece 3 in. x 1½ in. x ¾ in.	3.0	70	150
Scalloped potatoes (C, B_1)	1 cup (scant)	5.2	13	150
Buttered beets (B_1, A, C, G)	⅓ cup	2.0	3	50
Lettuce and tomato salad (C, B_1, A, G)	1 serving	5.4	6	200
Salted almonds (B_1)	12 nuts	0.5	13	100
Boiled custard (A, B_1, G)	½ cup	3.3	20	150
Macaroons	2 maracoons	0.8	6	100
				900
Total for day			327	3050

[1] Two tbsp. milk sugar instead of cane sugar. See Table II, Appendix.

A Day's Food Plan for a Fattening Diet for a Thin Woman

Fuel Requirement: 3000–3200 Calories

Ordinary Requirement: 2400–2600 Calories   Cost: 1½–1¾¢ per 100 Calories

Breakfast:	Orange juice or tomato juice	25–50 Calories
	Crisp dry cereal with figs, dates or raisins	150–250 Calories
	Milk	350 Calories
	Toast or muffin	100–150 Calories
	Butter substitute with vitamin A	100 Calories
	Jam	50–100 Calories
	Sugar	100 Calories
	Coffee (if desired)	
		800–900 Calories
10:30 a.m.:	Milk (Cold or hot, plain or flavored) or vegex bouillon with crackers. May be taken with luncheon if preferred.	160 Calories
Luncheon:	Baked Lima beans or split peas with bacon or Scalloped vegetable or Chowder with crackers	150–200 Calories
	Whole wheat bread or roll	100–150 Calories
	Butter substitute with vitamin A	100–150 Calories
	Peanut butter or Cheese or Jelly	100–150 Calories
	Steamed cranberry or other fruit pudding with hard or creamy sauce	250–300 Calories
		700–950 Calories
4:00 p.m.:	Hot cocoa or weak tea and crackers (May be taken with dinner if preferred)	100–250 Calories
Dinner:	Meat pie or pot roast or Ham scalloped with potato or Veal stew with rice	200–250 Calories
	Cooked vegetables (potato, turnip, parsnips, etc.)	100–150 Calories
	Raw green vegetable salad with French or boiled dressing	100–150 Calories
	Bread or toasted crackers	75–150 Calories
	Butter substitute with vitamin A	75–100 Calories
	Lemon pie or stewed fruit and cookies or pudding	250–350 Calories
		900–1100 Calories

A Day's Fattening Dietary for a Thin Woman

Cost Minimal

Fuel Value: 3076 Calories

Ordinary Requirement: 2400 Calories — Cost: 1½–1¾¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Tomato juice (A, B_1, C)	½ cup	4.0	5	25
Cornflakes with dates	⅜ cup and 4 dates	1.5	6	150
Milk for cereal (and coffee if taken) (A, B_1, G)	2 cups	17.0	66	340
Whole wheat muffin (B_1)	1 muffin 2¾ in. diam.	1.7	16	133
Butter substitute with vitamin A (A)	1 tbsp.	0.5	1	100
Carrot marmalade (A, B_1)	1 tbsp.	1.5	1	50
Sugar for cereal (and coffee if taken)	2 tbsp. (scant)	0.9	—	100
Coffee	1 cup	—	—	—
				898
10:30 A.M.:				
Vegex bouillon (B_1)	1 cup	—	—	—
Graham crackers	2½ crackers 2½ in. x 2¾ in. x ¼ in.	0.8	9	100
Luncheon:				
Scalloped cabbage (B_1, A)	½ cup	3.7	18	150
Whole wheat bread (B_1)	1½ slices 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter substitute with vitamin A (A)	1 tbsp.	0.5	1	100
Cottage cheese (A, B_1)	2½ tbsp.	1.6	38	50
Jelly	1¾ tbsp.	1.1	—	100
Steamed blueberry pudding	⅓ cup	2.4	22	220
Clear sauce	¼ cup	2.7	—	80
				800
4:00 P.M.:				
Hot cocoa with milk (A, B_1, G)	⅞ cup	8.0	34	210
Saltines	3 crackers	0.4	5	50
				260
Dinner:				
Veal stew with rice (G)	⅘ cup	6.0	32	200
Buttered kale (A, B_1, G)	½ cup	2.0	7	100
Toasted whole wheat muffins (B_1)	1 muffin 2¾ in. diam.	1.7	16	133
Butter substitute with vitamin A (A)	1 tbsp.	0.5	1	100
Cabbage and apple salad, boiled dressing (C, B_1, A)	1 cup	3.8	10	150
Norwegian prune pudding (A, G)	⅗ cup	5.1	4	250
Milk for pudding (A, B_1, G)	½ cup	4.2	17	85
				1018
Total for day			325	3076

Food for the Prospective Mother

Traditions in regard to food have a strong hold on the imagination in connection with those periods during which the unborn child or nursing infant derives its sustenance directly from its mother. Stuffing when food needs are not greatly increased, attributing mysterious influences to specific food materials, and supplying inadequate food when the nutritive requirements are really very much increased are common errors due to lack of knowledge of the fate and function of foods.

It is reassuring for the prospective mother to remember that all food is broken down in the chemical processes of digestion and reorganized in the body according to its needs. Meat helps to build muscle, not because it is already in that form, but because when digested it yields amino acids which the body can recombine into its own kinds of protein; the proteins of milk and eggs, the combined proteins of milk or eggs and cereals, and many of the proteins of vegetables will yield exactly the same kinds of amino acids and hence serve equally well for constructing new muscle. Nature tries to promote normal development of the offspring even under adverse conditions; if materials for the growth of the baby are lacking in the food, they will be drawn as far as possible from the mother's body. About twice as much calcium is needed in pregnancy as under ordinary conditions and at least fifty per cent more phosphorus and if the diet be deficient in these materials for bone formation, the mother's bones are likely to be the first to suffer loss, though, of course, a great scarcity is eventually likely to affect the baby. In certain regions there is the possibility of insufficient iodine for the best functioning of the thyroid gland. The regular use of iodized table salt or of a suitable preparation of iodine prescribed by the physician (who should always be supervising a pregnant woman) is desirable to forestall the possibility of development of simple goiter in the mother and for the welfare of the child.

Shortage of any one of the vitamins has been shown to have disastrous effects upon reproduction. The body does not carry large reserves of vitamins B, C, D, and G and must have new supplies constantly. While it does have the power of storing vita-

min A, often this has not been taken by the mother through her own developing years in sufficient amounts to allow much storage and in any case the demands of the unborn child for this vitamin are very great. Hence vitamin A should always be well represented in the mother's diet. In animal experiments it has been shown repeatedly that the offspring are born stronger and their mothers are able to nurse them better with less cost to themselves when vitamins A, B_1, C and G are liberally supplied. During pregnancy, there is an increasing need for vitamin C. Many tests have shown that without definite increase in the amount taken in the food the reserves of this vitamin tend to be greatly decreased in the later months. It seems wise to provide daily from 1000 to 1200 international units (50 to 60 milligrams).

The teeth of a child are largely determined before birth and shortages of calcium and phosphorus and of all the vitamins, but especially vitamins A, C, and D affect them very unfavorably. The teeth begin to develop very early and not only the temporary set but even some of the permanent ones are well formed before birth. For normally arched jaws, well-placed teeth and a strong coat of enamel to protect against early decay, liberal supplies of calcium, phosphorus, and vitamins A, C and D are all important. No mother should feel that she has done her full duty by her child unless she pays special attention to getting a rich store of vitamin D, either through long sun baths (exposed to the direct rays of the sun, not through window-glass) or by taking cod liver oil or preferably both. The best way to equip a child with the best teeth his heritage allows is through attention to the nutrition of the mother during pregnancy and lactation. At no other time is a diet supplied with proteins adequate for growth, minerals of all kinds (especially calcium, phosphorus, and iron), and all of the known vitamins in liberal amounts going to bring as big a return as when given to the mother upon whom an infant is dependent for all its sustenance.

For the most part, the same kinds of food which constitute a well-balanced diet for the mother under ordinary conditions will serve for the mother and child. Simple dishes, prepared from easily digested foods, should be adhered to for the sake of good

digestion, without which any food will fail of its purpose. When the digestive tract is particularly irritable, considerable care must be exercised in this respect, bearing in mind that fatigue, anxiety, and constipation may be large factors in indigestion. The majority of mothers suffer in the early stages of gestation from nutritional disturbances familiarly spoken of as "morning sickness." The cause of the nausea and vomiting at this time is not in the stomach itself, but is due to the fact that the connection between the mother and the embryo through the placenta is not yet perfectly established, and a disturbance results from substances necessary in the process of placenta formation getting into the general circulation and affecting the digestive tract for a time. During this time it is important to see that vitamin B_1 is liberally supplied. A tablet or two of the pure vitamin (thiamin) is very desirable when little food can be retained to maintain the daily supply. The use of a special cereal rich in vitamin B_1, of which several are on the market,[1] may be very helpful not only at this time, but throughout pregnancy. The disappearance of the morning sickness is an indication that the connection between mother and child which secures nourishment for the embryo from the mother's blood has been fully established, and from this time on the mother's appetite should steadily improve. Serious digestive disturbances should always be referred to a physician very promptly.

Any increase in the amount of food required on account of the developing child before the end of the fourth month of gestation has been shown to be insignificant. Beginning with the fifth month, growth is increasingly rapid up to the time of birth, but the actual amount of building material needed day by day is not very large, nor even in the last weeks will the energy demands be increased more than 20 per cent, or one-fifth of the mother's usual daily supply before pregnancy. They will be practically in proportion to her increase in body weight. A woman of sedentary habits will then need from 2400 to 2800 calories per day, while a woman who is usually active will probably be somewhat less so,

[1] For descriptions of such foods consult "Accepted Foods," The American Medical Association (1940).

and is seldom likely to require over 2800 calories. The increased requirements for building material and vitamins will be best met by the liberal use of milk and eggs, supplemented by fruit and green vegetables, sun baths, and cod liver oil. Frequent small meals are often utilized to better advantage than a few large meals especially in the last two or three months; in fact many of the suggestions which have already been given in regard to a fattening diet will be helpful in adjusting the food intake at this time. The day's diet should include:

1. Milk, from a pint to a quart per day. This may be used as a beverage with meals, or between meals, or employed in making cocoa, custards, milk sherbets, and other dishes. Sweet milk may be flavored in any way desired. Cocoa syrup is convenient to have at hand to stir into cold or hot milk and so are soluble coffee, postum and malted milk. Sweet milk may also be replaced by buttermilk, zoolak, koumiss, etc., if these are better liked or more easily digested. Cottage or other mild cheese may also replace a part (not all) of the milk.

2. Fruit, as oranges, apples, prunes, raisins, figs, dates, or other easily digested kinds, fresh or dried, cooked or raw. Fruit juices may be substituted for the whole fruit, especially where digestion is disturbed. A glass of orange or grapefruit juice once a day, to insure a liberal intake of vitamin C is important. When impossible to obtain, tomatoes canned or fresh can be used as a substitute.

3. A green vegetable, as spinach, peas, beans, lettuce, broccoli, kale, turnip greens, brussels sprouts, chard, etc. These may be served as salads, buttered, creamed, or in soups but it is worth while to learn to eat lettuce as one would celery, with no dressing but a little salt. Lettuce is not quite as valuable as spinach or peas, but it has the advantage of requiring no cooking. A large serving every day, no matter what other vegetables are eaten, would be a good rule. Many other vegetables are more delicious raw than people generally realize. Carrots cut into thin "straws," kohl-rabi, rutabaga, or white turnips in small cubes or sprigs of fresh cauliflower are all very appetizing raw. If cooked, the time should be as short as possible. Steaming or preparation which

will conserve the juices will help to save valuable minerals and vitamins. Five minutes are quite long enough to cook spinach, and 10 or 15 minutes are ample for cabbage. Broccoli and brussels sprouts should not be steamed long enough to make them soft. Cabbage and lettuce when not green have comparatively little vitamin A, but like celery and cauliflower are valuable for their minerals and vitamins B_1 and G and when raw for C. Pea and spinach soups made with milk are often useful when digestion is poor.

4. A whole grain cereal once a day and whole wheat bread regularly for at least two meals, or else a serving of wheat germ (one to three heaping tablespoons if flaked) or a yeast concentrate (such as vegex) or a portion of dried yeast, available in tablet form, to insure a liberal intake of vitamin B_1. Another way to get this vitamin is by the use of a reinforced cereal food, which will have either wheat germ or dried yeast or both added to it by the manufacturer. With so many possibilities today, no mother should fail to have a liberal supply of this vitamin.

5. One or two teaspoonfuls of cod liver oil or its equivalent in vitamins A and D. Halibut liver oil is very rich in vitamin A, so that a small capsule furnishing only 2 or 3 calories is as rich as a teaspoonful of cod liver oil, but it is not as rich in vitamin D, so that in pregnancy, if halibut liver oil capsules are preferred, they should be purchased with added vitamin D, or vitamin D milk substituted for ordinary milk.

6. Meat, fish, or some substitute such as eggs, liver, or cheese, once a day, will insure enough protein of good quality, add to the vitamin G content of the diet and furnish iron, to which not only meats but green vegetables and whole grain cereals would contribute if the supply is to be adequate.

7. Butter, olive oil, bacon, peanut butter, or butter substitute in moderate quantities to add to the fuel value of the diet. If whole milk and green vegetables are used freely there is not likely to be any shortage of vitamin A, but if the milk fat is not used, butter or a substitute known to contain vitamin A is desirable to replace it. Peanut butter has proteins of excellent quality in addition to its high caloric value and may be regarded

as an economical meat substitute rather than a butter substitute. It makes a delicious soup simply stirred into hot milk and seasoned with salt, or a delightful adjunct to bread and butter, when beaten smooth with as much cream as it can be made to take up. A well-balanced meal can be secured from 2 sandwiches of whole wheat bread with this creamed peanut butter filling to which some seeded raisins have been added, and a glass of milk. For the sake of ease of digestion, fats are best used in their simplest form, on bread, with potatoes, rice, and the like, rather than in the making of rich sauces and gravies. The food plan already given for a sedentary woman can easily be modified to yield 2700 to 2800 calories by adding a pint of milk, a couple of eggs, two small tablespoons of butter, and a piece of sweet chocolate. The food plan and dietary for an active woman will be suitable when digestion is good, and the fuel value can be easily increased by the use of milk or eggs, which, as already indicated, also give desirable increases in building and regulating material. In economical dietaries bread should be made with milk and preferably from whole wheat, rye, or other dark flours. It will add then to the laxative quality of the diet, as well as to its content of vitamin B_1, and iron. Such bread is good for any one, but most needed when green vegetables and milk cannot be bought freely.

Where cost must be carefully considered such menus as the following may prove useful:

I

BREAKFAST: Orange juice
Oatmeal, milk, and sugar
Whole wheat bread and butter or butter substitute containing vitamin A
Hot milk flavored with powdered coffee or postum or cocoa
Freshened prunes[1]

LUNCHEON: Cream of tomato soup
Cold corned beef
Whole wheat bread and butter or butter substitute
Hermits
Tea or coffee (one-half milk) or cocoa

[1] Soaked 24 hours then drained and allowed to stand 24 hours to "ripen."

Dinner: Lamb stew with vegetables (carrots, potatoes, onions)
Cole slaw
Whole wheat bread and butter or butter substitute
Custard or orange cream pie
Glass of milk

II

Breakfast: Grapefruit juice
Wheatena with added wheat germ, milk, and sugar
Dates, whole wheat bread, and butter or butter substitute
Hot milk flavored with powdered coffee or postum or cocoa

Luncheon: Macaroni and cheese
Stewed tomatoes
Whole wheat or rye bread and butter or butter substitute
Tea or coffee (one-half milk)

Dinner: Baked split peas with bacon
Boston brown bread
Stewed onions
Apple betty, milk and sugar
Glass of milk

III

Breakfast: Tomato juice
Shredded wheat biscuit, hot milk, butter, salt, and sugar
Cracked wheat bread and butter or butter substitute and apple jelly
Hot milk flavored with powdered coffee or postum or cocoa
Stewed dried peaches and raisins

Luncheon: Vegex bouillon with crackers
Whole wheat bread and peanut butter
Figs (stewed or raw)
Cocoa or glass of milk

Dinner: Corned beef hash
Stewed cabbage
Whole wheat bread and butter or butter substitute
Raw carrot straws, plain or with French dressing
Rice or tapioca pudding (made with milk, molasses, and raisins)
Glass of milk

These menus may be supplemented by a cup of milk or bouillon made with yeast concentrate and graham or whole wheat crackers, if extra nourishment is desired in the middle of the morning or in the late afternoon. A glass of fruit juice or a cup of hot weak tea with lemon in the late afternoon may be refreshing and add to the total water intake, which should be very liberal. Dried lemon powder can be had which keeps indefinitely and obviates the need of cutting a fresh lemon, when this might be too expensive. Prune juice with a little added lemon powder makes an acceptable mid-afternoon beverage. The butter substitute should always have added vitamin A.

Food for the Nursing Mother

When the baby is born we begin to realize more clearly that he has food requirements all his own. The sum total of the energy requirement of mother and child has been found to be the same just before birth and just after. But after birth we can study the baby by himself, see what his demands upon his commissary department amount to, and then add these requirements to those of the mother for her own maintenance to get her total daily food requirement. The baby grows rapidly and his food requirements increase daily. A baby a month old will take, on the average, two and one-third ounces of mother's milk per day for each pound of body weight, a twelve-pound child thus receiving about 28 ounces of milk in twenty-four hours. Since an ounce of mother's milk yields on the average 20 calories, the total day's fuel supply for such a child will be 560 calories. These must certainly be added to the mother's diet or they will be drawn from her body reserves.

The following estimates of the increased energy demands made by the nursing infant are calculated on the basis of a ten per cent increase over estimated requirements which seems a reasonable allowance since we cannot calculate the baby's requirements more closely than this.

Additional fuel requirements for nursing a baby:

First 3 months.	60 calories per pound of infant's weight
Second 3 months.	50 calories per pound of infant's weight
Third and fourth 3 months. . . .	40–45 calories per pound of infant's weight

This means that a woman of average weight and sedentary occupation will require while nursing a baby as much food *as if she were doing hard muscular work*, *i.e.*, 2800 to 3000 calories per day; while a woman actively employed and secreting a large quantity of milk may need as much as 5000 calories.

Not only is there this increase in the energy requirement, but the construction of milk demands extra quantities of such important materials as protein, calcium, phosphorus, and all the vitamins. Studies with cows show that the efficiency of milk protein for the production of a new milk supply is about 60 per

cent. Such data indicate that the mixed diet ought to supply at least two protein calories for each one withdrawn in the mother's milk, and milk itself must be considered one of the most desirable foods for milk production. On this basis, from three to four protein calories should be allowed for every ounce of milk produced.

The mineral requirements increase also as the baby grows. Even at the age of one month, the baby's need for calcium in milk will almost double the mother's dietary requirement. Modern studies of nursing mothers indicate that at least twice as much calcium is required during the lactation period if there is to be no robbing of the mother's body of this element so essential to the best health, and if the milk furnished the baby is to be of the best quality. A full quart and a half of milk is the best way to meet this extra demand.

Another mineral which must be carefully safeguarded is iron. Some protection is afforded during the cessation of menstruation, but it is nevertheless important that the daily diet furnish 15 to 18 milligrams. Eggs, green vegetables, dried peas and beans, and whole grain cereals are the best sources.

Vitamin requirements also increase as the baby grows and demands more milk. At the age of one month, the baby taking 28 ounces of human milk will increase the mother's vitamin A requirement more than 50 per cent. At least twice her ordinary requrement will be required throughout lactation to prevent loss of her own reserve, and more will be desirable. The inclusion of a teaspoonful of cod liver oil in addition to milk and green vegetables, an egg a day if possible, and butter or a butter substitute of as high vitamin A value as butter should insure ample protection under ordinary conditions.

Requirements for vitamin B_1 are increased for the nursing mother far beyond the amount which ordinarily meets her needs, and beyond the amount in the milk which she gives to the baby. In the light of present knowledge it seems desirable for her to have two to three times as much as in ordinary circumstances. Thus the mother requiring 3000 calories per day will need at least 500 to 600 international units of vitamin B_1. This amount will

not be obtained without special care. Foods which she will probably have routinely for other reasons (1½ quarts of milk, ¾ cup of orange or tomato juice, 2 medium-sized potatoes, a cup of cooked green vegetable, a liberal portion of a raw green vegeable) will provide about 250 I.U. or perhaps one-half. If as much as 200 calories of whole wheat bread are eaten at each meal, this will furnish at least 150 I.U. in addition, and the best way to insure the remaining one or two hundred units is by the use of some specially rich source, as wheat germ, dried yeast, yeast extract or the pure crystalline thiamin.

While there must be great insistence on a liberal supply of vitamin C for the mother during pregnancy, since she is the sole source of supply for the fetus, attention is divided between mother and child during lactation. When the mother's requirements are not met during pregnancy, the fetus is supplied at her expense, but in the period of lactation, a shortage of vitamin C is reflected first in the milk, and the baby is the one who suffers most. The best plan is to see that both mother and baby are generously supplied, but there need be no special effort to increase the mother's intake in lactation over what it has been in pregnancy. The liberal use of fruit juice or tomato juice has so much to commend it that the habit should be maintained.

The nursing mother needs ample provision of vitamin D to enable her to use to best advantage the increased amounts of calcium which she must absorb and transmit to the baby through her milk. Cod liver oil or some other equally good source of vitamins A and D should be used routinely through pregnancy and lactation, but it must be clearly understood that vitamin D is a means of using calcium and phosphorus more efficiently and not a substitute for them. Both the amount of milk and the calcium content of the diet are improved when all three are liberal.

The value of liberal vitamin G for the best development of the young and to enable the mother to endure the extra drains of pregnancy and lactation is shown, not only by long and careful laboratory study of animals but also by some studies of human beings. When mothers furnishing milk for their own babies and

an average of 13 ounces a day more for the Mother's Milk Bureau in Detroit, Michigan, were given an extra portion of 10 grams of yeast furnishing 75 to 150 Bourquin-Sherman units of vitamin G, their milk was increased and they "experienced less fatigue and had a more satisfactory feeling of well-being."

The diet which is adequate in other essentials, when composed of such food materials as suggested in the foregoing pages and in the food plan on page 163 will, so far as is now known, be adequate in vitamin G.

A liberal supply of water is essential since more water is required to help the body take care of extra food successfully, and since the milk which the baby gets every day contains considerable water which must be derived from the mother's supply. A quart of milk a day will furnish part of this water, but in addition at least four glasses of water or other liquid should be taken during the day. A glass of water on arising, one just before each meal and one on going to bed is a good rule, easy to remember and convenient to put into practice.

The general plan of diet suggested for the prospective mother[1] may be followed by the nursing mother, and the dietaries for thin men and women[2] will be suggestive as to how to keep up the fuel value of the diet. Since foods are broken down in the digestive tract and made over in the body, it is absurd to think that particular foods have specific effects upon the character of the milk. Any wholesome diet, ample in all dietary essentials, is suitable for good milk production. In the past, the importance of vitamins in milk production has not been sufficiently recognized. With our present knowledge almost every mother who is not ill can nurse her baby at least through the most critical part of its life, the first three or four months, and 95 out of every hundred for the first 7 or 8 months.[3] At the same time it must be borne in mind that the mammary glands are very sensitive to nervous influences, and lack of sleep and rest and disturbances of

[1] See page 155.

[2] See pages 108, 110, 149, and 151.

[3] Helpful suggestions regarding breast feeding will be found in the pamphlet, *Infant Care*, The Children's Bureau, U. S. Department of Labor, Washington, D. C. (Children's Bureau Publication No. 8, 1938).

A Day's Dietary for a Nursing Mother also Doing Moderate Muscular Work

Fuel Value: 3230 Calories — Cost: 1½–1¾¢ per Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Dark farina with added wheat germ (B_1)	¾ cup	6.0	15	100
Milk (A, B_1, G)	⅝ cup	5.1	19	100
Sugar	1 tbsp. (scant)	0.5	—	50
Whole wheat bread (B_1)	1½ slices, 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter substitute with vitamin A (A)	¾ tbsp.	0.4	—	75
Cocoa II[1] (A, B_1, G)	⅘ cup	7.6	32	200
Stewed prunes (A)	4 prunes and juice	5.6	4	200
				825
Luncheon:				
Cream of tomato soup with ⅛ tsp. vegex (B_1)	1 cup (scant)	8.0	28	250
Cold corned bee. (with fat) (G)	1 small serving	2.0	42	200
Whole wheat bread (B_1)	2¼ slices, 3 in. x 3¾ in. x ½ in.	2.1	24	150
Butter substitute, with vitamin A (A)	1½ tbsp.	0.7	1	150
Milk for tea (A, B_1, G)	⅓ cup	2.6	10	50
Sugar for tea	2 tsp.	0.3	—	35
Gingerbread II[1]	1 small piece	1.2	8	100
Tea	1 cup	—	—	—
				935
Dinner:				
Lamb stew with vegetables (G)	2 cups	17.0	67	350
Cole slaw with green pepper (C, A)	½ cup	1.6	3	35
Whole wheat bread (B_1)	2¼ slices, 3 in. x 3¾ in. x ½ in.	2.1	24	150
Butter substitute with vitamin A (A)	1 tbsp.	0.5	—	100
Cocoanut custard pie (A)	1/7 pie	6.8	44	400
Milk for tea (A, B_1, G)	⅓ cup	2.6	10	50
Sugar for tea	2 tsp.	0.3	—	35
				1120
Lunch at Night:				
Bread	2 slices	1.4	14	100
Butter substitute with vitamin A (A)	½ tbsp.	0.3	—	50
Peanut butter (B_1)	2½ tsp.	0.6	19	100
Milk (A, B_1, G)	⅝ cup	5.1	19	100
				1470
Total for day			399	3230

[1] See Table II, Appendix.

digestion react very unfavorably upon the milk-secreting mechanism. Rest and an adequate diet eaten with regularity will do much to keep digestion good but any food which is known to disagree with the mother, or whose effect is doubtful should be refrained from. The increased demands for food make the work of the digestive tract extraordinarily great, hence there is more danger than usual of an upset, and the diet should be correspondingly simpler and easier of digestion. Excitement, worry, fatigue, chill, constipation, all react quickly and unfavorably upon the milk secretion, and must be carefully guarded against. Successful nursing demands a quiet, contented life, in which food is intelligently chosen, and sunshine, exercise, fresh air, and mental diversion are provided. For the few months which are so critical in the life of the baby, less important interests must be set aside, even those of other members of the family who can better afford a little neglect.

A very simple, inexpensive dietary, meeting the requirements of the nursing mother also engaged in physical labor (from one of the menus on pages 157 and 158), is given on the preceding page.

In addition to regular meals, a glass or bowl of hot milk, malted milk, eggnog or vegex bouillon taken just before nursing the baby in mid-morning or mid-afternoon is often beneficial, as it gives both extra food and extra water.

Chapter VII

FOOD FOR THE BABY

HAPPY the baby who enjoys his inalienable right to Nature's food supply—his own mother's milk! His chances of a long and healthy life are immensely greater than those of the poor child who has to be artifically fed. In case of misfortune depriving him of his natural food supply, the best substitute is the milk of some other healthy woman with a baby of approximately the same age, but unfortunately this kind of substitute is not readily commanded by the average family, and the faithful cow has usually to be relied upon when the normal supply is cut off. That such a substitute is far from ideal has been repeatedly demonstrated. One of the more recent studies made by Dr. Clifford G. Grulee, of 20,000 Chicago babies, confirms earlier findings, even though methods of infant feeding have steadily improved. He found that the breast fed babies were remarkably free from gastro-intestinal and respiratory diseases during the first year, and their mortality rate was only about one-tenth as high as that of the artificially fed, while that of babies with mixed feeding lay between the other two. And these figures do not tell the whole story. As Dr. Alexis Carrel points out in a recent plea to American mothers to insist on nursing their babies, the labor of the baby in suckling (which is a hard task) aids in the physical development of the jaws, the nose and the roof of the mouth. He says: "Artificial feeding is partly responsible for the protruding upper jaw, recessed chin, ill-formed nose, flattened mouth arch, which many children display today. These malformations cause defective dentition, and predispose to infections of the tonsils, pharynx, ears and sinuses."[1] This accumulating evidence makes clear the importance of a mother's making every effort to start the baby right and give him

[1] Carrel, A. "Breast Feeding for Babies," *The Reader's Digest*, Vol. 34, pp. 1–7 (1939).

a fair chance to live and thrive. Every month of breast-feeding is to be regarded as so much gain for the baby. We know that with proper care in pregnancy and regular supervision after birth, most mothers can nurse their babies successfully. If the milk supply is insufficient it can be increased by mechanical stimulation of the breasts, and if it becomes necessary to give additional food the discarding of the natural food is not justified on this account. Only when it fails entirely, or there is some serious disturbance of the mother's health which makes nursing unwise, should artificial feeding be adopted as the sole means of sustenance.

Good breast-feeding cannot be done carelessly, however. The mother must take the best possible care of herself, eating wholesome food in sufficient amounts, as outlined in Chapter VI; leading a regular, hygienic, peaceful life as far as she is able, in order to maintain a full and uniform milk supply. She must keep in mind that upon her rests the responsibility for the healthy development of her baby not only at the present time but in future years; must avoid indigestible food, or food that spoils her appetite so as to prevent sufficient quantities of food being taken; must have regular hours for meals and rest; get direct sunshine or its equivalent in ultra-violet light or cod liver oil, also fresh air and exercise; avoid fatigue and overwork; keep her mind pleasurably occupied while avoiding excitement; and, finally, she must feed the baby according to a definite schedule.

A healthy baby grows fast. During the first six months he should double his birth weight, and by the end of the year triple it. He must not only digest food for this rapid body building, but he must have energy for the daily maintenance of his internal and external body activities besides, the result being that he has to take care of much more food in proportion to his weight than an adult does, and any upset in digestion is a very serious matter. Hence, anything in the mother's life which might disturb her steady production of wholesome milk must be avoided, and likewise anything in the baby's life which might cause indigestion. He must have plenty of sleep and be allowed to lie quietly by himself when awake, have plenty of fresh air to breathe and clothing which will give him a chance to exercise his arms and legs freely,

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The baby's sole business in life is to grow.

so that he need not get all of his exercise by crying. He must have sun baths regularly, with the sun's rays playing directly on the skin. Clothing and window glass keep out the ultra-violet rays. Beginning at the age of 3 or 4 weeks, the baby born in the spring or summer should be in the direct sunlight for 10 or 15 minutes, increasing the time 3 to 5 minutes daily until he lies directly in the sun one hour in the morning and one hour in the afternoon, care being always taken not to burn the baby. The winter baby must take his sun bath in a place sheltered from the wind, possibly indoors in front of an open window with a screen arranged to ward off drafts.

Above all, the baby must get his meals regularly. With definite hours for feeding, the quality of the milk is more uniform, and the alimentary tract responds better to the food. The stomach needs an interval of rest between meals, and the secretions of the whole alimentary tract are strongly influenced by habit, pouring out more freely under the stimulus of regular feeding. The appetite is less fickle, too, when meals come at definite times. "Meals by the clock" is one of the first rules of successful feeding.

What the schedule shall be depends somewhat upon circumstances, but nowadays babies are fed much less frequently than they used to be, with benefit to their digestion and more freedom for their mothers. For the first month it is customary to feed them six times in twenty-four hours, and after that five times till the fourth month, then four times till the eighth month, then going on a three-meal schedule. Schedules are generally arranged as follows:

Suggested Schedule of Hours for Infant Feeding

Period	Number of Feedings per Day	Hours for Feeding	
		A.M.	P.M.
First month	6	2, 6, 10	2, 6, 10
Second to fourth months	5	6, 10	2, 6, 10
Fifth to seventh months	4	7, 10	2, 6
Eighth to twelfth months	3	7	12, 6

If the baby is delicate, shorter intervals between feedings are sometimes prescribed, but never less than two hours; if sturdy,

four-hour intervals are frequently adopted at the very start. Such schedules should if possible be arranged under the advice of a competent physician. Strict observance of the schedule determined upon is more important than the exact interval between feedings or the number of feedings in the day, but in general long intervals promote good digestion better than do short ones.

If the baby frets between meals he should be given cool (not cold) boiled water from a bottle or spoon—nothing else. Pacifiers are to be strictly avoided. They spoil the shape of the mouth and are bad carriers of germs; the constant sucking is undesirable for many reasons and swallowing air causes gastric discomfort.

After meals the baby should be "bubbled", that is, placed upright and patted very gently for a moment or two to bring up the "gas" (generally air which he may have swallowed), then laid in his crib to rest quietly and soon go to sleep. His chief business in life is to grow. He is not to be considered a source of entertainment, nor should efforts be made to amuse him. The healthy baby when awake will play quietly by himself and not get over-excited nor exhausted. We judge the feeding to be successful when he makes steady gains in weight, averaging about eight ounces a week in the early months, and falling gradually to about four ounces a week; and when by quiet sleep, absence of fretfulness, and other signs of health he shows that his diet agrees with him.

Preparation for Weaning

The age at which a baby may be weaned depends upon the finding of other food which contains all the essentials for growth in a form in which the baby can digest them with ease. It is always difficult to feed a very young baby any food but his mother's milk. Each month it becomes increasingly easier, and in enlightened communities where good clean cow's milk is available and mothers receive expert guidance in the care of their babies through local health stations, private physicians, or at least government publications such as those of the Children's Bureau of the United States Department of Labor, it is safe to wean babies sometime between the ninth and twelfth months.

But preparation for weaning should begin some time before

this, so that the baby will not have to get adjusted to too many new foods all at once. We should start a program of gradual adjustment which will give plenty of time to establish in turn each of the foods essential to the diet when the child is weaned, introducing but one at a time, and allowing the child to become fully accustomed to each before another is added.

Since mother's milk is not rich in vitamin D, special pains must be taken to supplement this for the child, practically from birth. Sun baths are ideal but in the cold, cloudy winters of many regions, there is no opportunity for daily exposure to a sun that does not shine. Fortunately cod liver oil is an effective source of vitamin D and only a little is needed if begun before rickets has developed at all. It is well to give the baby in a northern climate a few drops daily at the age of two weeks. Very soon a quarter of a teaspoonful may be given from a medicine dropper or spoon, laying the baby on the mother's lap with its feet higher than its head and gently holding its mouth open by pressing the cheeks with thumb and fingers. The oil should be given very gradually, keeping the mouth open until the oil entirely disappears. This avoids its dribbling down on the baby's face and clothing. By the third week the amount can be increased to half a teaspoonful and by the fifth or sixth week to a full teaspoonful. This amount is usually sufficient until the end of the third month, when it can be increased to one teaspoonful twice daily and so continued throughout the first year. Sun baths should also be given whenever possible, but it should be remembered that the antirachitic value of sunlight in northern winters is low. In Toronto, for instance, the sunshine has been found to be eight times as efficient in April or May as in December, January and February.

Vitamin D is not only a preventive of rickets and an important factor in good tooth development but also a promoter of growth. Studies by Drs. P. C. Jeans and Genevieve Stearns at the University of Iowa have shown that present day babies given one teaspoonful of cod liver oil daily are longer and heavier than the standards accepted for well babies even as late as 1929.

Owing to the widespread use of cod liver oil the incidence of

rickets is on the way to eradication. Among preschool children in Chicago, from 1926 to 1932, examination of 1000 to 2000 children showed 16 to 21 per cent with definite evidence of rickets, but in 1933 the percentage fell to 13.7 and in 1935 to 7.1 with the percentage of cases of severe rickets only 0.03.

By the fourth week, a portion of some food rich in vitamin C should be added to the baby's dietary, to afford ample protection for the developing teeth, and to keep the blood vessels strong and growth at its best. Orange or tomato juice, fresh or canned, is usually most convenient. At first only a teaspoonful of orange juice diluted with an equal amount of water (or two teaspoonfuls of tomato juice) should be given once a day midway between two regular feedings. After a week the orange juice can be given undiluted and the amount gradually increased by a teaspoonful a week, so that at the end of the second month the baby will be receiving at least a tablespoonful a day. By the third month this should be increased to two tablespoonfuls. Thereafter this should be regarded as the minimum amount and unless great economy is necessary it should be increased to three or four tablespoonfuls. If tomato juice is substituted, twice as large a quantity should be used. Water to drink should be offered regularly between each two feedings, so that from two to six ounces are taken daily, for the baby's water needs are as high as his other food needs.

Besides providing vitamin C the orange and tomato juice will furnish another important supplement to mother's milk, vitamin B_1, but since the baby's need is much higher than was formerly realized, some other source should also be provided. This additional amount will probably be obtained from the cereal which should be added at the fourth month. There are now on the market cereals with added wheat germ or added yeast or both, and these should be given preference for the baby's diet.[1] The cheapest is a white farina with added wheat germ or pure vitamin B_1 of which a quarter of an ounce (dry weight) will furnish approximately as much vitamin B_1 as a pint of milk.

[1] For the composition of these foods consult *Accepted Foods*, American Medical Association (1940).

Several pre-cooked infant foods of high value for minerals and vitamins are available for those who can afford them. These are very convenient, since they require no cooking but only the addition of a little milk to obtain the desired consistency. Any cereal given the baby should be soft, smooth and free from harsh particles. Those prepared at home should be cooked several times longer than recommended for adults. At first only a teaspoonful of the cereal preparation need be given as this is the baby's first lesson in eating something which is not fluid and time must be given him to learn it. This may be given twice a day with the 10 A.M. and 6 P.M. feedings, and increased gradually to two tablespoonfuls at each of these feedings. If a cereal without added vitamin B_1 is used, the mother can furnish the extra vitamin B_1 by adding wheat germ herself, or by giving the baby ⅛ of a teaspoonful of concentrated yeast extract (vegex) in a couple of tablespoonfuls of water. The cereal should be fed with no seasoning except a little salt. It should be neither hot nor cold, just comfortably warm and of a jelly-like consistency, easily fed from a spoon. The person giving it should always know how it tastes and keep it the same, day after day. The amount should be increased to three or four tablespoons twice a day at the seventh month. If a specially reinforced baby cereal is not used, a dark farina or a white one which has added iron as well as vitamin B_1 should be used after two or three weeks of cereal feeding.

At the fourth month, additional iron may be obtained by the introduction of egg yolk, of which at first half a teaspoonful may be given with the 2 P.M. feeding, gradually increasing it to one whole yolk.

At the fifth month vegetables, cooked and put through a strainer, should be included in the diet. Preference should be given to those rich in minerals and vitamin A, such as spinach, peas and carrots. They need to be started early so that the habit of eating them will be easily and firmly established. These vegetables should be quickly cooked, in the least possible water and any left at the end evaporated off, so that there will be no loss of nutritive material from throwing the cooking water away.

Excellent strained vegetables for babies may be purchased in small cans or jars and are desirable to have in the house for emergency use even if they seem too expensive to feed every day. At first only a teaspoonful of this strained vegetable pulp need be given with the 2 P.M. feeding, gradually increasing the amount to one tablespoonful. A change to chopped or mashed vegetables is recommended by the sixth month, so that the baby will have training in eating coarser foods.

By the sixth month, the menu can be extended to include some kind of mild, soft fruit, such as apple sauce, or mashed ripe banana or chopped stewed prunes. At first only a teaspoonful should be given, but this can rapidly be increased to one or two tablespoons. This fruit may be given with the 2 P.M. feeding.

By the seventh month a tablespoon of baked potato can also be added to the 6 P.M. meal and a piece of stale bread or zwieback to the 10 A.M. feeding.

The baby must begin to use his jaws on resistant material, and his teeth as soon as they appear. A hard dry bread crust or a piece of zwieback offers suitable resistance without danger of choking on large pieces. Once or twice a day from the seventh month he should have this exercise, and gradually he will learn the important lesson of chewing which not only helps in digestion and in the development of teeth and jaws but is a pleasure no child should be deprived of. At this time it may be well to introduce a little liver into the diet, as a further safeguard against anemia. The raw liver should be put through a food chopper and the pulp then rubbed through a sieve. One tablespoonful once or twice a week may be used as an alternative to egg yolk. It may be added to the vegetable pulp and thoroughly heated with it before serving.

When the child is nine months old, he will be ready to learn to take cow's milk, the food around which his diet should be built throughout the remainder of his childhood. By the fifth month the 10 P.M. feeding is generally discontinued and between the ninth and tenth months the baby is weaned and the feeding schedule is changed from every four hours to three meals a day. As a

substitute for the 10 A.M. feeding, fruit juice may be given and if the child is hungry in the mid-afternoon milk and a piece of zwieback may be given.

Dr. Josephine H. Kenyon has very clearly described the weaning process: [1] "Gradual weaning is a deliberately planned transfer: it is an adjustment from breast milk to three or four meals a day and requires a full month to accomplish. For two weeks substitute two bottles or cup feedings for the breast at any convenient mealtime. Then add one more milk feeding, making three milk and one or two breast periods for another week or two. The breast milk will decrease gradually in quantity when there are so few nursings daily. The baby acts as the natural breast pump and may be nursed at the feeding times when the breasts are full or uncomfortable. Usually after a week or ten days of this, the baby will not gain so well and will show you in other ways that he needs more food. Then the time has come to stop the breast feeding."

The Care of the Baby's Milk

"Laboratory" and "certified" milk are guaranteed to be wholesome. In the country one should know the conditions under which the milk is produced, and buy only that which is from cows tuberculin tested each year and has been kept clean and cold from the time of milking. Pasteurization is the great safeguard against disease-producing bacteria. But it must be remembered that pasteurized milk needs exactly the same kind of care as fresh milk. It must be kept clean and cold and be used within a short time, for it is not "germ-proof," but even more capable of growing bacteria than before it was pasteurized, and there is not the warning that we have in fresh milk, *i.e.*, souring. It must also be remembered that whatever supply of vitamin C there may have been in the fresh milk may be reduced by the heating, hence a child's diet should always have some other source of this vitamin. Bringing milk quickly to a boil is as effective as pasteurization in destroying bacteria, and tends to make it easier to

[1] Kenyon, J. H. *Healthy Babies are Happy Babies*, p. 167, Little Brown and Co. (1938).

digest, so that either fresh or pasteurized milk may be boiled one minute and cooled again quickly if one wishes to be doubly sure of its safety.

A satisfactory alternative to fluid milk is unsweetened evaporated milk. It has the advantage of being somewhat easier to digest. The milk is heated in a partial vacuum until about 60 per cent of the water is removed. The fat globules are broken into very minute particles, so that they remain distributed throughout the milk instead of rising as cream. The curds formed in digestion are extremely fine, resembling those formed by human milk. There is loss of about one-fifth of the vitamin B_1 and the greater part of the vitamin C. Some brands of evaporated milk are irradiated, giving a vitamin D value which makes a pint of the evaporated milk equivalent to about half a teaspoonful of cod liver oil. Other brands are enriched with a vitamin D concentrate from cod liver oil, so that a pint of the milk is equivalent to at least a full teaspoon of cod liver oil. It is sterile in the can and is regarded by many pediatricians as the most suitable milk for infant feeding. It must not be confused with condensed milk, which is prepared with the addition of about 45 per cent of cane sugar, giving a diet high in calories but low in all other dietary essentials, and so "unbalanced" that even skilful supplementing with ordinary foods could scarcely make it adequate in all respects.

Dried whole milk can also be obtained which has most if not all of the original vitamin C value of the fresh milk. For emergency use, or for a long journey it is invaluable. In purchasing one must distinguish between dried whole milk, which should be used for babies, and dried skim milk, which is also an excellent food, but will not give the baby the butter fat which he should have in his diet.

All milk must be protected from contamination at home as well as in transit. It should be put in a cold place and covered. Milk for the baby should be thoroughly mixed so that the cream is evenly distributed, and each meal put in a clean sterile feeding bottle (washed with hot water containing washing soda, then boiled in clear water for 20 minutes), stoppered, and kept cold

till used. Just before feeding, it can be warmed to body temperature in hot water. Any food left over should be used some other way, not kept for the baby. A thermos bottle should never be used to keep milk warm; germs grow fast in milk when warm.

Daily Feeding Program for the Breast-fed Baby to the End of the First Year

First Month: Breast feedings at 2, 6, 10 A.M., 2, 6, 10 P.M.
At second week, ¼ teaspoon of cod liver oil daily with one breast feeding, increasing gradually to ½ teaspoon by third week.

Second Month: Omit 2 A.M. breast feeding.
Add 1 teaspoon orange juice mixed with 1 teaspoon water one hour before 10 A.M. feeding. Increase gradually to 1 tablespoon of orange juice, at same time decreasing water till juice is given undiluted at end of month.
Give ½ teaspoon cod liver oil daily, increasing gradually to 1 teaspoon by sixth week.

Third Month: Increase cod liver oil gradually from 1 teaspoon to 2 teaspoons daily, and orange juice from 1 tablespoon to 2 tablespoons.

Fourth Month: Add 1 teaspoon cooked cereal with added wheat germ or other source of vitamin B_1 at 10 A.M. feeding and 1 teaspoon with 6 P.M. feeding. Increase gradually to 2 tablespoons at each of these feedings.
Substitute 1 bottle for 2 P.M. breast feeding.
Increase orange juice to 2 tablespoons.
Add ½ teaspoon egg yolk with 2 P.M. feeding increasing gradually to yolk of one egg.

Fifth Month: Omit 10 P.M. feeding.
Add 1 teaspoon vegetable pulp with 2 P.M. feeding. (Spinach, carrots, peas, or a mixture of these), increasing gradually to 1 tablespoon.
Increase orange juice to 4–6 tablespoons.

Sixth Month: Add 1 teaspoon fruit pulp, increasing gradually to 2 tablespoons with 2 P.M. feeding. (Apples, prunes, apricots, ripe bananas).

Seventh Month: Add 1 tablespoon baked potato to 6 P.M. and 1 piece of bread crust or zwieback after 10 A.M. feeding.

Eighth Month: Meals at 7 A.M., 12 P.M., and 5:30 or 6 P.M.

Breakfast:	6 oz. milk to drink
	3 to 5 tbsp. cooked cereal with 2 oz. milk
	1 small piece zwieback or stale bread to chew
	1 tsp. cod liver oil
10 A.M.:	4 to 5 tbsp. orange juice

EIGHTH MONTH:—*Continued*

DINNER:	1 egg yolk 2 to 4 tbsp. sifted vegetable pulp 2 to 4 tbsp. baked potato with ¼ tsp. butter 2 to 4 tbsp. stewed fruit pulp 6 to 8 oz. milk to drink 1 small piece stale bread to chew
4 P.M.:	3 to 5 tbsp. fruit juice
SUPPER:	8 oz. milk to drink 3 to 5 tbsp. cooked cereal with 2 oz. milk 1 tsp. cod liver oil

NINTH MONTH TO END OF YEAR: Continue the same program, increasing amounts of cereals, vegetables and fruit gradually as the child grows. Rice or macaroni may be substituted now and then for potato if desired. One to 2 teaspoons of finely chopped liver may be substituted once or twice a week for egg yolk.

Artificial Feeding

Unfortunately there will always be some babies deprived more or less completely of their natural food. Mothers having the best of intentions occasionally fail to produce milk, or furnish an inadequate supply, and other misfortunes may rob the baby of the birthright. For such children a substitute for the natural food must be provided. Nothing can take the place of milk for this purpose, even though it be milk from another species of animal, such as the cow. If possible a baby under three months of age should have part, if not all, of his milk from his mother. In some of our large cities where breast milk is for sale, this may be substituted for mother's milk for the very young baby. But for the most part, cow's milk is the best available substitute for mother's milk and the first problem in artificial feeding is one of adapting it to the digestive tract of the baby and at the same time providing, as far as possible, a normal supply of all the essentials for growth. There are many ways in which this objective can be attained, and the wise physician adopts the plan which seems best suited to the individual case. Much thought and care have been given by many pediatricians to the arrangement of suitable feeding schedules for the artificially fed infant to avoid overfeeding on the one hand and underfeeding on the other while adjusting week by week to the increasing strength of the child. Such schedules must take into account the requirement of the

baby for every one of the essentials for nutrition. Before considering any program, then, it will be well to summarize these requirements briefly.

The Energy Requirement of the Baby

The energy requirements of babies of different ages have been investigated carefully, with the infants lying quietly asleep, and not having had any food for three or four hours. In the Carnegie Nutrition Laboratory in Boston alone, more than one hundred infants have been studied in the calorimeter. Newborn babies asleep beside their mothers give off nearly two and one-half times as many calories per pound as the mothers. An allowance of from 30 to 35 calories per pound is necessary merely to keep a baby alive. Babies cannot lie quietly all the time, however. If they are to grow and acquire strong muscles they must have exercise, which they get by crying, kicking, pounding with their fists, and various other movements. This means work, requiring a further supply of energy. A five-months-old baby has been shown to double his energy expenditure by the effort of crying. Active children really work as hard as any adult manual laborer.

Furthermore, a baby is constantly storing food materials in his body in the process of growth. Every day as much as ¼ to ⅓ of the calories represented in his food may be used in this way. All the energy demands of the baby — (1) for the maintenance of life processes, more rapid than in the adult, (2) for muscular activity, often great, and (3) for storage in growth—make the infant's total energy requirement during the first three months of his life about 50 calories per pound per day. As he grows older, the requirement for internal activities becomes gradually less in proportion to body weight, the rate of growth falls, and therefore the total requirement for the second three months is about 45 calories per pound per day; for the rest of the first year about 40 calories per pound per day.

The Protein and Mineral Requirements of the Baby

Babies grow fast. The new born child normally doubles its weight in the first six months. All kinds of building material must

be liberally provided. The protein of the diet must not only meet daily needs but also supply the requisite amino acids for all the growing tissues. In the early months as much as one third of the protein eaten may be converted into body protein. Milk is rich in proteins containing the amino acids essential for growth and can be depended upon for the protein supply. It has been found that an ounce and a half of cow's milk for every pound of the baby's weight will furnish adequate protein for growth. This means about three grams of protein per pound of body weight, or twelve to fifteen protein calories in every hundred total calories.

Calcium and phosphorus are both provided in cow's milk in sufficiently liberal amounts to meet requirements for growth when as much as an ounce and a half of milk is provided for each pound of baby's weight. As the child grows, care must be taken to see to it that foods which are low in calcium are not allowed to displace milk and cause the diet to become inferior in this important respect.

The baby comes into the world, as Dr. Sherman has aptly pointed out, calcium poor and iron rich. Hence it needs calcium from the day of birth in liberal amounts, but can get along for a time with the small amount of iron in milk which serves as a supplement to its own body store. But by the end of the second month some special source of iron is needed to keep the baby growing at a good rate and building good red blood. It has been found by many studies of infants that at least half a milligram of iron (0.0005 gram) for each pound of body weight is desirable. Special cereals with added iron have proven very satisfactory, as the babies can eat more of this kind of food in the early months than they can of egg yolk or green vegetables, both of which are excellent supplements to milk later on when sufficiently large quantities can be taken. It is desirable that the iron in the diet average at least 0.7 of a milligram for every 100 calories of food. As the baby grows and new foods are added to the diet, those which will furnish iron should be given preference. There is a distinct advantage in an amount of iron which will allow a considerable surplus over daily requirement. Infection interferes

with the use of iron. Any infection, even a slight cold, will cause a drop in the percentage of hemoglobin in the blood, and much larger amounts of iron may be needed to restore it than were necessary to maintain it under normal conditions. Iron is used to best advantage only when small amounts of copper are also present in the diet, but since most cereals, fruits and vegetables contain appreciable amounts, it is not usually necessary to provide any special source of copper.

In order that the quantity of minerals obtained from milk may be liberal, it is desirable that the milk be diluted only so much as may be absolutely necessary to insure ease of digestion. One of the advantages of evaporated milk is that babies can take it with less dilution because of its greater ease of digestion.

The Vitamin Requirements of the Baby

It has already been pointed out that the need of the growing child for vitamins is relatively great in proportion to his size. For the best growth and protection against infection it is desirable that, in addition to the vitamin A furnished in milk, the baby receive daily after the first month at least one teaspoonful of cod liver oil. As other foods are added to the diet, these can also be chosen with regard to their vitamin A value, helping to increase the body reserves.

Diluted cow's milk does not furnish enough vitamin B_1 for a baby's best health and growth. Many feeding tests have shown that babies have better appetite and digestion, are more contented and sleep better when vitamin B_1 is generously supplied. For modifying the milk, dextrimaltose with added wheat germ and yeast is available and can be given to the youngest baby. An extract of wheat germ known as vitavose, and the yeast extract known as vegex, are all suitable for the early months. When the child is old enough to take a cereal food apart from the milk formula, a special cereal with added vitamin B_1 will be found very convenient.[1] The baby needs at least 10 to 15 international units of vitamin B_1 for every 100 calories of food, and

[1] For a description of special foods for infant feeding consult "Accepted Foods." The American Medical Association (1940).

in case of even a mild infection the amount should be doubled for some time after the child is apparently well. In case of vomiting, the loss of the vitamin is a serious factor in causing failure of appetite and slow return to normal digestion. As soon as any fluid can be borne, some vitamin B_1 should be given.

Infants can use with benefit much larger amounts of vitamin C than are necessary to protect them from outward signs of scurvy. The Nutrition Commission of the League of Nations recommends that not less than one tablespoonful of orange juice (or its equivalent) be given to every baby. Just how many times this minimum will be most advantageous is not yet established but for the best protection of all the tissues, including the developing teeth, it seems desirable to begin the orange juice as early as possible and to increase it gradually until by the sixth month at least three or four tablespoonfuls are taken every day.

Very thorough studies of babies' needs for vitamin D have been made by Dr. Martha Eliot of the United States Children's Bureau, in consequence of which the Bureau recommends that all infants, beginning at the age of two weeks, receive daily vitamin-tested cod liver oil. As in the case of the breast fed baby, a dose of a few drops at first is gradually increased until by the end of the third month two doses of one teaspoonful each are taken daily, this amount to be continued throughout infancy.

Daily Food Program for Artificial Feeding

The schedule of hours for feeding babies artificially will on the whole be the same as for breast fed babies, but since those bottle-fed from birth are apt to be more delicate, they are sometimes fed every three hours for some weeks longer than the breast fed baby, *i.e.*, till the end of the second or third month.

As to the quantity of milk needed, it has been found that for the first three or four months an ounce and one-half of milk per pound of baby's weight will give the daily supply of protein. From the beginning of the fifth to the end of the ninth month babies are usually allowed 1¾ to 2 ounces of milk for each pound of their weight. To this must be added some easily digested carbohydrate food which will dissolve in the milk, preferably karo

syrup, milk sugar, or some form of so-called malt food (e.g., dextri-maltose). The amount to be added is determined by finding the calories yielded by the milk allowance for the day and deducting this from the total calories required. Thus one and one-half ounces of milk per pound for a 14-pound baby would mean 21 ounces for the day, furnishing approximately 420 calories. A four-months-old baby of this weight, requiring perhaps 45 calories per pound, would need 630 calories per day. Deducting the calories furnished by the milk, we have left 210 calories to be secured from about two ounces of the carbohydrate food selected.

Water is added to the milk mixture to make the diet easier to digest. The amount of food which the baby is able to take at each feeding naturally increases as he grows. The first week about 2 or 2½ ounces per feeding will be sufficient. The second, third and fourth weeks, this can be increased to 3 or 4 ounces, the second month to 4½ or 5 ounces, the third month to 5 or 6 ounces and thereafter by about an ounce a month until 8 ounces is reached. By that time other foods are a regular part of the diet and the amount of milk is not increased further. We may estimate the water to be added by calculating the total amount of fluid required and deducting the amount of milk from this. The difference will be the water to add. The baby's milk mixture should be prepared for the day, then quickly brought to the boiling point and held there for three minutes, after which it should be rapidly cooled in running water. This protects against bacteria and makes the milk easier to digest.

The following schedule has been worked out to illustrate these principles. It should be adapted to the individual baby, preferably by conference with a physician who will examine the baby frequently in order to know just what kind of progress is being made, and to correct any unsuitable measures before they have a chance to do harm. Only thus can ideal adjustments be made.

It is hoped that the baby can be breast fed at least for several months. In starting to feed an older baby, select a formula for one several months younger and increase the strength gradually until the child is taking the full amount of food suggested for his age.

SCHEDULE FOR ARTIFICIAL FEEDING OF WELL BABIES
BASED ON AVERAGE WEIGHT FOR AGE, IN QUANTITIES FOR 24 HOURS

AGE	NO. FEEDINGS	VOL. OF FEEDING OZ.	WHOLE MILK[1] OZ.	WATER OZ.	KARO[2] SYRUP TBSP.	ORANGE JUICE TBSP.	COOKED CEREAL[3] TBSP.	STALE BREAD TOAST OR ZWIEBACK SLICES	GREEN VEGETABLE PULP TBSP.	EGG YOLK	COD LIVER OIL TSP.
Days											
5, 6, 7	6	2½	10	5	1½	—	—	—	—	—	—
8-14	6	3½	14	7	2	—	—	—	—	—	½
Weeks											
2-4	6	4	16	8	2	⅛–1	—	—	—	—	1
Months Beginning of											
2nd	5	4½	17	7½	2½	1–2	—	—	—	—	2
3rd	5	5½	19	8½	2½	2	1	—	—	—	2
4th	4	6½	20	6	2½	2	2	—	⅛	½	2
5th	4	7	20	8	2½	2	3	—	1	½	2
6th	4	7½	22	8	2½	3–4	4	—	2	1	2
7th	4	7½	24	6	2	4	6	1	2	1	2
8th	4	8	28	4	2	5	8	1	2	1	2
9th	4	8	28	4	2	5	8	1	3	1	2
10th	4	8	32	0	0	6	8	1	3	1	2
11th	4	8	32	0	0	6	8	1	4	1	2
12th	4	8	32	0	0	6	8	1	5	1	2

[1] If evaporated milk is used, take half the amount of milk and add an equal amount of water. Then proceed as with whole milk.

[2] Dextri-maltose with added wheat germ and yeast may be substituted wholly or in part. (In using dextri-maltose increase the quantities in the proportion of one teaspoonful for each tablespoon of karo prescribed.) If karo is used, one fourth tsp. of vegex should be added for Vitamin B_1.

[3] With added vitamin B_1: home cooked with 1 tsp. wheat germ added or some vitamin B_1-rich cereal specially prepared for babies.

Emergency Infant Foods

The baby's health is so very dependent upon having the right amounts of the right foods every day that every precaution must be taken against any mishaps, and especially against any failure of his milk supply. He needs food just as much when the milk train is snowed in on a cold wintry morning or when unusual summer heat has spoiled the daily supply as any other day. So it is well to have an emergency shelf just for the baby. Here may be placed either one or two cans of a reliable brand of evaporated milk which will keep indefinitely until opened; or a package of dried

whole milk, which will keep several months but later on will go stale and should be used in cooking and not for the baby. To make evaporated milk equal in volume to fresh milk, one measure must be added to an equal measure of water. To make dried whole milk equal to fresh, three-fourths of a cup of the powder should be added to a pint of water and beaten until thoroughly mixed.

There may also be on the baby's shelf convenient little jars of canned strained or chopped vegetables according to his age—peas, beans, etc., and likewise of strained or chopped prunes or apricots and of canned orange or tomato juice. A ready-to-eat cereal specially for babies should also be at hand. These are very convenient if the fresh vegetable or fruit supply fails or if some emergency in the family life makes the preparation of the baby's food difficult.

The End of the First Year

At the end of the first year, whether a baby be breast or bottle-fed, he should have reached the point where he drinks plain warm boiled cow's milk taking about one quart a day, and twice a day 3 or 4 tablespoonfuls of orange juice (or twice as much tomato juice), 1 teaspoonful of cod liver oil, 2 or 3 tablespoonfuls of strained green vegetable pulp, the yolk of an egg, 2 to 4 tablespoonfuls of thoroughly cooked cereal, and at least once a day a piece of stale bread, crisp toast, or zwieback to chew. Nothing else is needed to keep a baby healthy and no risk of upsetting his digestive tract should be run by adding other foods. Because a baby is not made violently ill by tea, coffee, sugar, sweet crackers, watermelon, and what not, it does not follow that these are desirable. The perversion of his appetite, so that he does not desire the foods which are best for him, is a serious matter, though the results are not immediately apparent. The child's chief business in life is to grow strong and develop good habits. Regular hours for eating, sun baths, and sleeping, regular supplies of carefully chosen food, and plenty of fresh air mean not only the development of sturdy legs and rosy cheeks, but of good eating habits and a strong digestive tract able to stand the inevitable

strains of later life. Good growth in this part of the body cannot be seen directly, but it counts tremendously when the whole life is in review. One year of good feeding at the beginning of life is more important than ten after forty, and a baby's needs are not to be judged by an adult's inclinations. Feeding must be a matter of principle and not of impulse; the reward will be partly in the present—much more in the future.

Chapter VIII

FOOD FOR THE TWO-YEAR-OLD

By following such a program as has been suggested for the first year, making every effort to maintain the supply of breast milk through the major part of the year, and cautiously yet systematically adding to the child's diet those foods which not only enhance its immediate value but also prepare for the future, there should be no special difficulty in feeding during the second year. The woes of "the second summer" and "teething" are mostly the result of bad feeding. To boast that a fifteen-months-old baby "eats everything" is not a tribute to its precocity but to the ignorance or willful negligence of its mother.

In these first two years the child must be patiently taught what to eat and how to eat it. No phase of education is more important or demands more skill. The mother must make haste to learn how, for training in good eating habits cannot begin too early.[1] No human being can safely eat according to his whims. Each must learn that eating is an important duty, to be faithfully performed day by day. In the healthy child, hunger usually makes it a pleasant duty, but not always. New foods do not always appeal, by any means. They must be "learned," sometimes by many repetitions. We should make the conditions of learning as favorable as we can. For the very little child this means first of all that he shall have the appetite which comes from good health and freedom from physical or nervous fatigue; second, that there shall be a cheerful person who can heartily commend to him the food of which he is to partake; and third, that the food itself shall be of just the same flavor and texture

[1] For help regarding problems in child training consult *Good Food Habits for Children*, Leaflet No. 42, U. S. Department of Agriculture, *The Child from One to Six*, Children's Bureau Publication No. 30, and *Child Management*, Children's Bureau Publication No. 143, U. S. Department of Labor. In these other excellent helps are suggested.

and temperature that it was when he had it before. Thus the habit of eating that food becomes established. When he balks, it is well to try to discover the reason. If there seems to be none, he should not be pushed too far—not required to eat too much—but made to eat enough to realize that he is eating the food that he refused. There should be no fuss, no sign of anxiety nor of excitement, and so, getting no satisfaction out of refusal, he is less likely to try to repeat it. It often takes time, patience and ingenuity to establish essential foods in the child's diet, but the earlier one begins the easier it will be.

The most important of these foods is milk. It should remain the chief staple throughout the second year, from three cups to a quart being incorporated into the diet daily. This generally means drinking two to three cups and using the rest in preparing various foods. Usually not more than a quart altogether, including that used in cooking, should be given, as there must be opportunity to get in other foods too. At this particular age three cups of milk and an otherwise well-assorted diet will be better than four cups and neglect of vegetables and fruit, but scientific study has year by year emphasized the importance of milk as a food for growth. In 1906 Hopkins of Cambridge University showed that animals on diets made up from highly purified protein, fat, carbohydrate, and minerals, would not thrive, but immediately began to improve when a little milk was added to their diet. Since then numerous experimenters, both in this country and Europe, have piled up evidence: (1) that the proteins of milk are of the very best quality for growth, and when combined with the proteins of cereals and vegetables improve their quality, too; (2) that milk is rich in vitamin A, so that with a quart of whole milk per day in a child's diet, there is little occasion to fear actual shortage of this vitamin; (3) that the supply of vitamin B_1, while not so liberal as that of vitamin A, is still important; (4) that milk is an excellent source of vitamin G; (5) that milk is the most important source of calcium for the child's bones and teeth, and that children have a high capacity for storing calcium, best met by a quart of milk a day; (6) that milk is a rich source of phosphorus also essential for bones and

teeth; (7) that besides calcium and phosphorus and vitamins A, B_1 and G, milk has a rich and varied assortment of other minerals and vitamins essential to health and growth; even its iron, though not large in amount, should not be disregarded since a quart will probably furnish more than any other item in the young child's diet. It must, of course, be supplemented by other iron-bearing foods, principally green vegetables, egg yolk, liver, and whole grain cereals or, if cost is no consideration, the prepared cereal foods with added iron as well as vitamin B_1, now available for children's use. Such foods will furnish in addition the copper and other substances which enable the body to build the red pigment of the blood and prevent anemia. To cut down the supply of milk after the first year is a grievous mistake. The important thing is to know what foods to add to capitalize its many contributions to an adequate diet, and adapt it to the requirements of children of different ages. What is needed after the first year is not suppression, but supplementation.

The Food Program for the Second Year

Before birth and during the first year, the hardness of the teeth, the perfection of the enamel, good occlusion and healthy roots are largely determined, but for several years longer the permanent set will be developing out of sight in the jaws, and the only way to grow good teeth is by attention to diet. After they come through the gums, we may keep them "as good as new" on the outside by cleanliness and dental care, but we make them from what we eat. Teeth are not dead structures; they are affected by diet all the time. So the greatest change in the eating program from the first year to the second is in the direction of more exercise for the teeth and jaws through the systematic use of food to chew. The program outlined for the last month of the first year needs comparatively little modification for the second year. There should be three meals a day and one regular lunch; the first at 7 A.M. or not later than 7:30 A.M.; and the last at 5:30 or not later than 6 P.M. The time of the mid-day meal and of a supplementary mid-morning or mid-afternoon lunch will depend upon whether there is a nap in the late forenoon (11:30 A.M.)

or at a later time (12:30 P.M.). Adequate rest is necessary to enable a child to utilize his food. Many children are undernourished primarily from lack of rest. Thirteen hours should be allowed for the night's sleep, and at 7 P.M. no two-year-old should be out of bed. If he can be in bed at 6, so much the better.

Cereals can still be used to advantage twice a day. For variety two kinds may be given the same day instead of using the same one morning and evening. Any kind selected should be cooked till thoroughly softened. For the convenience of mothers in emergencies or when away from home, cooked cereals in small cans or special dry cereal requiring only milk to moisten are available nowadays. They are also convenient for supper, but are rather expensive. From one-half an ounce to one ounce of dry cereal cooked thoroughly can usually be fed daily. Preference should be given to cereals made from the whole grains or those with added wheat germ. Oatmeal and farina from the whole wheat are rich in iron as well as vitamin B_1; and are economical besides. Unless there is a tendency to looseness of the bowels, oatmeal can well be used at least three or four times a week when strict economy must be practiced, alternating with some whole wheat preparation. The cereal foods should be served warm with milk or thin cream (top milk) but sugar should be used very sparingly if at all. The less sugar as such in the two-year-old's diet the better. It should be used only where necessary to make certain foods such as stewed fruits or simple desserts palatable. It supplies calories only and by its enticing flavor tends to crowd out foods carrying building and regulating material. Spinach is one of the popular vegetables in the nursery school, but it would never be if a lollipop came first. Sugar blunts and perverts the appetite. Furthermore, children's diets must be very rich in minerals and vitamins and a food like sugar, which furnishes calories only, inevitably dilutes the rest of the diet, making the whole of poorer quality. Every mother should understand clearly this diluting danger of sugar and recognize that she does her child a kindness when she withholds it. The less the little child knows of it the better. Candy, cake of all kinds, jams, marmalades, and preserves have no proper place in the food program

It often takes time and patience to establish essential foods in the child's diet, but the earlier one begins the easier it will be.

of young children. They are all too often the unrecognized cause of digestive disturbances, which if not serious in themselves depress the child's resistance to colds and other infections. Furthermore, evidence has accumulated that the presence of sugar in the mouth is a distinct menace to the teeth. Children with restricted sugar have been found to have better teeth than those using it freely, and in case of adults, the habit of holding candies in the mouth for long periods has resulted in great deterioration of the enamel.

The use of egg yolk in little children's diets is desirable because it furnishes proteins of excellent quality, a rich supply of phosphorus and iron, and vitamins A, B_1 and G. One yolk daily is as much as should be given. It should be introduced cautiously, as some very young children are disturbed by it. If the quantity is not too large, there is less likelihood of trouble. It can be combined without cooking with orange juice, or mixed with soft crumbs of bread or mashed potatoes; or it can be boiled till mealy, rubbed to a paste, and spread on a piece of bread. Once in a while the whole egg may be given for a change, but for children of this age who are getting 3 or 4 cups of milk a day the white, which furnishes protein chiefly, is superfluous and is best used in the family diet, where it will be more appreciated. An excellent alternate to egg yolk is a tablespoonful of liver, steamed and finely ground, which can be spread on bread or mixed with mashed potato or other vegetable.

Every day some fruit juice should be given. Orange juice and tomato juice either fresh or canned remain the staple sources for vitamin C. In addition other fruits mild in flavor may be introduced, such as chopped prunes or apricots, apple sauce, juice of pineapples or fresh peaches. As prunes have no vitamin C, a little orange juice may be advantageously added to them. Chopped canned fruits for little children are available on the market and are useful when little fresh fruit is available. Not more than two or three tablespoonfuls should be given at one time. If a new kind is being tried, only half the usual quantity should be given. Fruit is important not only for vitamin C but because it helps to counteract constipation and adds a variety

of mineral elements and vitamins B_1 and G. In addition to the morning orange juice (or equivalent) some soft cooked fruit lightly sweetened (apple sauce, fresh ripe pear or apricot) is desirable with the noonday and evening meals unless it makes the diet too laxative, in which case it should be given only at dinner, that with the supper being postponed for a while longer.

There may be some additions to the number of vegetables eaten, but spinach, carrots, string beans, and green peas are good staples, and can be used both singly and in combination with one another. A wider range is merely for the sake of convenience. Any vegetable chosen should be mild in flavor, finely chopped and given in moderate amounts (1 to 3 tablespoonfuls). It must always be remembered that green vegetables are given for their minerals and vitamins, and care must be taken that the cooking process is one which will conserve these. The flavor of vegetables depends partly on their being strictly fresh and of good quality, but perhaps quite as much upon good cooking. The time of cooking should be as short as possible and the seasoning most expertly done. Vegetables are too important in the diet to trust their preparation to careless hands. Excellent preparations of vegetables for young children are now on the market in small cans and are convenient for emergencies even if they seem too expensive for frequent use.

During this year the vegetable soup made with milk and a little flour for thickening is an exceedingly practical alternate to the evening cereal. The potato should not be regarded as taking the place of green vegetables, but as occupying a little dietary niche all its own. It is so generally available, so easy to prepare and digest, so good a source of calories and the vitamins B_1 and C to say nothing of iron and other mineral constituents, that it may well appear in the diet once a day after the first year. At first only one or two tablespoonfuls of a baked potato fresh from the oven (or its equivalent, one freshly boiled in its jacket) should be mashed and moistened with a little cream, or else seasoned with a very little butter.

The routine use of cod liver oil should be continued throughout childhood. One teaspoonful daily will provide adequate vitamin

D for the normal child who gets at least a little sunshine every day, and will also be very valuable for its vitamin A. Even if vitamin D milk is used a small portion of cod liver oil is advisable.

One of the commonest mistakes in feeding in the second year is to give too many kinds of food. The older members of the family must rigidly refrain from offering "tastes" of their food, or in any way suggesting to the child the thought of eating the food provided for adults. It is very important for him to learn early that adults' and children's food are not the same, any more than their clothing. What mother would put French-heeled slippers on an eighteen-months-old baby? Yet the same mother will offer her little child a twenty-five-year-old's food, quite content with the fact that he swallows it. If he is subsequently fretful and restless—that is "bad temper!"

While personal traits develop early, and clearly indicated likes and dislikes have to be met as best one can, it is a foolish notion that any whim should be allowed to control the selection of food. What if a person disliked all foods containing protein? Should he be permitted to die of nitrogen starvation? Food needs of the body are governed by scientific laws, and the more the mind is trained to recognize and respect these laws, the simpler the feeding problem becomes. The adult who is responsible for the welfare of the child is the authority as to what he shall eat, and not the baby who is as yet but a little creature with no knowledge of his own needs. The early inculcation of good eating habits is one of the most fundamental things in his training. He may, like Darwin, become world famous in spite of forty-three years of dyspepsia, but what might not Darwin have accomplished if he had been able to work a whole day at a time, instead of only half a day! People who offer to children, for whose feeding they are not responsible, anything to eat without express permission are vandals, guilty of a greater outrage than if they should tear or ruin their clothes. An attack of indigestion has far-reaching consequences in a little child; it may retard the healthy development of the digestive tract itself; it may help to stunt growth in general; or it may so lower the resistance of the body to bacteria that harmful organisms gain a foothold and acute illness results. It pays

to take the best of care in the feeding of little children; to give them the few simple foods that are best for them in an atmosphere which promotes contentment; to prepare these foods with care, so that appetite and digestion may be fostered; and to serve them in meals of unfailing regularity.

The results of good feeding are cumulative. Each succeeding year means chances of greater strength and, what is more important in life to-day, greater endurance of strain and resistance to disease. If a child does not make good gains in height and manifest other signs of health, he should be given a thorough health examination so that any handicap may be removed at the earliest possible moment.

A Day's Food Plan for a Child One and One-Half to Two Years Old

Fuel Requirement: 900–1200 Calories — Cost: 2–2½¢ per 100 Calories

7 A.M.:	Orange juice, 4–6 tbsp.	30–50 Calories
	Well-cooked whole grain cereal and wheat germ, 3–4 tbsp.	25–50 Calories
	Top milk for cereal, 2–4 tbsp.	50–100 Calories
	Warm milk to drink, ¾–1 cup	125–170 Calories
	Stale bread or Dry toast or Plain zwieback, 1–2 slices	50–100 Calories
	Cod liver oil, 1–2 tsp.	33–66 Calories
12 M.:	Yolk of egg or 1 tbsp. liver paste	25–60 Calories
	Baked potato, 1–2 tbsp.	10–20 Calories
	Stale bread or Dry toast, 1–2 slices	50–100 Calories
	Chopped green vegetable or Chopped carrots, 3 tbsp.	5–20 Calories
	Warm milk to drink, 1 cup	170 Calories
	Cooked and mashed fruit pulp, 1–2 tbsp.	10–25 Calories
3 P.M.:	Warm milk, ¾–1 cup	125–170 Calories
	Hard cracker or stale bread	10–25 Calories
5:30 P.M.:	Well-cooked whole grain cereal and wheat germ, 3–4 tbsp.	25–50 Calories
	Top milk, 2–4 tbsp.	50–75 Calories
	Stale bread, 1–2 slices	50–100 Calories
	Cooked and mashed fruit pulp, 1–2 tbsp.	10–25 Calories
	Warm milk to drink, ⅞ cup	150 Calories

The food plan given here illustrates the arrangement of a schedule for meals, and the dietary worked out on this plan is suited to the food needs of the average child of eighteen months. An allowance of about 40 calories per pound will cover the energy needs of the second year. Four protein calories per pound will meet the need for nitrogen, and the selection of foods indicated will afford an abundance of minerals and vitamins.

A DAY'S DIETARY FOR A CHILD ONE AND ONE-HALF YEARS OLD

Fuel Value: 1191 Calories   Cost: 2¼¢ per 100 Calories

	Measure	Weight Oz.	Protein Calories	Total Calories
7 A.M.:				
Orange juice (C, B_1, A)	6 tbsp.	3.0	—	50
Cod liver oil (D, A)	1 tsp.	0.2	—	33
Dark farina with added wheat germ (B_1)	3 tbsp.	1.5	5	30
Top milk (10 oz.) (A)	2 tbsp.	1.0	5	50
Warm milk (A, B_1, G)	1 cup	8.5	34	170
Stale bread	1 slice	0.7	7	50
				383
12 M.:				
Yolk of egg (A, B_1, D, G)	1 yolk	0.6	11	56
Baked potato (C, B_1)	2 tbsp.	1.5	6	50
Toast, whole wheat	1 slice	0.5	7	50
Chopped peas (A, B_1, C, G)	1 tbsp.	0.6	—	9
Warm milk (A, B_1, G)	1 cup	8.5	34	170
				335
3 P.M.:				
Warm milk (A, B_1, G)	¾ cup	6.4	24	125
Whole wheat cracker	1 cracker	0.3	2	25
				150
5:30 P.M.:				
Dark farina with added wheat germ (B_1)	2 tbsp.	1.0	3	20
Top milk (10 oz.) (A)	2 tbsp.	1.0	5	50
Stale bread	1 slice	0.7	7	50
Apple pulp (B_1, C)	2 tbsp.	1.0	—	20
Warm milk (A, B_1, G)	⅞ cup	7.4	29	150
Cod liver oil (D, A)	1 tsp.	0.2	—	33
				323
Total for day			179	1191

Chapter IX

FOOD FOR CHILDREN THREE AND FOUR YEARS OLD

Adhering to the principle of gradual increase in the complexity of the diet, there will be no striking changes in the character of the food during this period. As children grow older they take an increasing interest in the appearance and flavor of food, and enjoy occasional changes in the form in which it is served, and even in the dishes used.

Milk is still the basis of the diet, from three cups to one quart a day being a suitable amount for most children. Some of the cream from the top of the bottle may be removed and used for the cereal, and a portion of the remaining milk used in making a vegetable soup; another portion for some very simple dessert, as junket, plain baked or boiled custard, cornstarch or gelatin blanc mange, bread, tapioca, rice, or other cereal pudding (without raisins). Such a dessert can now be served once a day. The rest of the milk will usually be drunk (slightly warmed); but, again, part of it may be used for supper in a dish of bread and milk; or of milk toast; or with rice or some other cereal taking up milk readily (such as shredded wheat or a special children's cereal). In this way adaptations can be made to the tastes of individual children without any real change in the character of the diet. Milk is milk whether drunk from a cup or eaten with a spoon as rice pudding or delicate pink junket.[1]

A well-cooked cereal should appear in the menu at least once a day. The choice is practically unlimited, though cereals from the whole grains and those with added vitamin B_1 should have the

[1] Excellent suggestions for young children may be found in *Food for Children*, Farmers' Bulletin No. 1674, U. S. Department of Agriculture; *Feeding the Child from Two to Six*, Barnes, Mary F., The Macmillan Company (1928); *How to Feed Children at Home*, and *How to Feed Children in Nursery Schools*, The Merrill-Palmer School, Detroit, Mich. (1936).

preference. The most important point is thoroughness of cooking, so that the cellulose is softened in the highest degree and the flavor of the grain is developed. This makes for palatability, which is very important. Many cereal preparations are now rolled thin and thoroughly heated in the factory, but these still need time for the very dry particles to become thoroughly penetrated with moisture to be at their best as regards texture and flavor and they have the disadvantage that much of the vitamin B_1 is destroyed. Since these bland dishes are a very important part of the little child's diet, too much emphasis cannot be laid upon care in their selection and preparation.

A cereal of different character from that usually served for breakfast can often be made the main dish for supper, rice, corn-meal, and occasionally crisp flaked cereals or shredded wheat lending themselves well to this purpose. Milk or cream may be used freely with the cereal foods, but not sugar; this should be reserved for desserts and not depended on to flavor plain foods like cereals and bread, because sugar blunts the appetite so that less cereal is likely to be eaten and children are apt to tire of highly sweetened foods sooner. Nothing is really gained by cultivating a perverted appetite for the sake of getting a particular food eaten. To allow a child to eat ice cream and oatmeal, mouthful about, is not establishing the oatmeal habit. Persistent feeding of a small amount, properly prepared, temporarily making up the deficiency in some other way (as by more plain bread and milk) seems to be the best method.

Some form of dry, rather hard bread, preferably from whole wheat or other dark flour, should be included in each meal, and for the sake of tooth and jaw development should never be neglected. Most crackers are too easily softened to serve the purpose well, and tend to cling to the teeth, though hard, whole wheat crackers may be given now and then for variety. As long as milk is the staple in the diet, and eggs and fruit and vegetables can be given daily, it is not necessary to use dark bread exclusively, but it is so good a source of iron and vitamin B_1 that to disregard it seems an opportunity lost, especially since the habit will be a good one for later years when the diet cannot have the

rigid daily supervision which is rightly given to that of the young child.

Fruit should be given at least once a day, twice if it can be afforded. If digestion is feeble, only the fruit preparations previously allowed and in about the same quantity (two to four tablespoonfuls) should be given. If the child is sturdy, any mild fruit of delicate texture, thoroughly cooked, such as baked apples (pulp only), freshly stewed Bartlett pears, baked or steamed banana or stewed apricots, may be gradually introduced into the diet. All of these should be cooked with little sugar and about three to six tablespoonfuls given at one time, according to the age and the strength of the child.

A fresh vegetable (green as often as possible) of mild flavor and delicate texture should be made a regular part of the daily diet; it may be mashed or chopped but should not be sifted, as the child must learn to take foods of different textures. String beans, squash, and stewed celery are good additions to the former list. Raw vegetables need special preparation to be well digested by little children, but the habit of eating them is one which should be cultivated early. To this end one or two teaspoonfuls of finely grated carrot or minced tender lettuce, moistened with a little orange juice, may be used as the filling of a sandwich. Such fillings take the place, in little children's diets, of jellies or jams. They are just as well liked by the children and afford much better food education.

Delicate cabbage is possible, when other green vegetables are hard to obtain. It should be shredded exceedingly fine and steamed in an open vessel in a very little water for fifteen or twenty minutes, when the water should have mostly evaporated. A seasoning of salt and a teaspoonful of cream can then be added. Tomatoes, being at all times rich in vitamins A, B_1 and C, are a valuable resource especially in winter when fresh, raw vegetables are not easily obtainable. In addition to being used as an alternate to orange juice the strained juice incorporated into a white sauce and this poured over a crisp soda cracker or a slice of toast makes a good main dish for a meal. Children also like a dish of scrambled eggs and tomatoes served with mashed

potato. Where great economy is necessary, dried peas and beans may be used in soups, being digestible in this form and valuable for mineral constituents and vitamin B_1. A little tomato can be combined with either from time to time. As with cereals, exceedingly great care in cooking is necessary to make vegetables wholesome and attractive, and since in later life these become more and more a source of the indispensable minerals and vitamins, pains should be taken to teach children to delight in them. At this period, however, they only supplement milk, eggs, and fruit, and it is often better to be content if the child tastes a vegetable than to have a pitched battle over eating a larger amount. New foods are often unpopular simply because of their strangeness; with familiarity, the impression always being given that they are desirable, one can in time overcome many seeming aversions.

Egg yolk is still the important part of the egg, containing most of the vitamins, all the iron, and the larger part of all the other mineral elements, but a whole egg makes a good dish for a midday meal, cooked in any way in which it is kept soft—"boiled," poached, coddled, or shirred; in an omelet or cooked with milk as creamy egg, egg timbale, etc.; but never hardened by high temperatures or coated with fat as in frying. Often it will be incorporated into the dessert, and sometimes instead of the cooked desserts children relish an "egg pudding," which is really an eggnog, the egg beaten up in milk and moderately sweetened. Not more than one egg should be used in a day, but one yolk should be used at least three or four times a week. Long experiments in feeding diets with and without egg have shown that although excellent growth can be secured on a ration of milk, vegetables, and cereal, better growth and greater vigor are obtained when a daily portion of egg is included. As an alternative, liver, steamed and then finely chopped, in amounts not exceeding two tablespoons a day, can be used once or twice a week. This is by far the best "meat" for children as it has growth-promoting properties which ordinary (muscle) meats do not possess.

Cod liver oil remains the best staple for vitamin D because of

its richness also in vitamin A. It should have its regular place in the daily program so that it will not be forgotten.

The diet for the child from two to four is to be built around milk, vegetables, fruit, whole grain or specially fortified cereals, and hard or at least stale bread. Egg or liver and potato once a day and butter in moderation, on bread and potatoes and in small amounts in cooked vegetables, help to make up a liberal energy supply.

No other foods are needed to keep a normal child in healthy condition up to the beginning of the fifth year. The great temptation is to enlarge the range of fancy concoctions too fast, and to feed the little children at the family table too soon. If they must be served there, they should be taught to pay no regard whatever to the food eaten by the other members of the family. The best meal schedules generally insure their being fed by themselves, however, which is more satisfactory in all respects; they are not tempted to cry for things they should not have; adults are not tempted to give them "tastes"; and exclusive attention can be given to their food education including manner of eating, which is also important if they are to become civilized members of society.

The rise of the nursery school has afforded a fine demonstration of the ease with which these principles of feeding can be carried out with young children eating in groups. They accept their foods cheerfully, do not pay too much attention to them and clear their plates (the food being served in proportion to their nutritive requirement). They are helped to acquire good food habits by the fact that "everybody is doing it," an influence not so easily commanded by the individual home, but making clear that the simple foods which are suitable, served attractively, with the full expectation that they will be cheerfully received, will be eaten and digested and promote excellent growth.

The average weight of healthy girls and boys for the third and fourth years is in round numbers 35 and 37½ pounds respectively. An allowance of from 37 to 40 calories per pound will cover the energy needs of these years, and three or four protein calories per pound will meet the nitrogen requirement. The food intake

Well nourished children are happy children.

of individual children will vary considerably from any standard because the rate of growth differs and so does the muscular activity. Quite early, little boys exhibit a higher degree of muscular tension than little girls, so that even if they seem to play in much the same way the boys may give evidence of a larger amount of energy expended by a more insistent demand for food. Throughout the growing period, the best way to meet this situation is to supply food according to the standards developed by the study of many children, to watch weight and appetite, and to guard against possible under-feeding by supplying as extra fuel as much plain bread, milk, and cereals as the child desires. If a child is really in need of food, he will eat plain bread, dry grapenuts or cornflakes cheerfully; if not, such food will not tempt him to overeat merely to please the palate. In no case should food be offered except at mealtime, but the drinking of water between meals should be encouraged, as children are often thirsty without realizing it, and their water needs are high.

The meal schedule still includes three "regular" meals, *i.e.*, breakfast, dinner, and supper, with a light supplementary meal between dinner and supper. As long as this meal is given it should be just as regularly planned for as the other meals, but it should be very simple, as one does not wish the bad habit of indiscriminate eating between meals to come out of it.

The food plan and dietary given on pages 201 and 202 illustrate the practical working out of the principles discussed above, and the accompanying plan for a week's menus as given to the mothers of children in a nursery school may also afford helpful suggestions.

Children who have an early breakfast may need a feeding of milk or fruit juice shortly after arrival at the school. This must not be postponed to interfere with the child's appetite for the midday dinner.

It is generally agreed that the food intake at the nursery school should include one pint of milk, one egg or its equivalent in liver with fish or lean meat suitably prepared as an occasional alternate, at least one slice of whole wheat bread, preferably toasted, a cooked vegetable, preferably green, a small portion of uncooked

Nursery School Menu

with

Suggested Breakfasts and Suppers

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
Breakfast: Calories, 250–320	Cereal, 1/8–1/2 cup Milk, 2 oz. Fruit juice, 3–6 tbsp. Toast, 1/2–1 slice Butter, 1/4–1 tsp. Milk, 6 oz. Cod liver oil, 1 tsp.	Same	Same	Same	Same
9:30 Calories, 100–120	Milk or milk-fruit juice drink, 3/4 cup	Same	Same	Same	Same
11:30 Calories, 400–525	Pea purée with egg, 3–5 tbsp. Mashed potato, 3–5 tbsp. Toast, 1/2 slice Sandwich, 1 slice Butter, 1 tsp. Milk, 3/4 cup Apple sauce, 1/4–1/3 cup	Scalloped tomatoes, 2–4 tbsp. Creamed liver, 1–2 tbsp. Baked potato, 1 Toast, 1/2 slice Sandwich, 1 slice Butter, 1 tsp. Milk, 3/4 cup Fruit cup, 1/4–1/3 cup	String beans, 2–4 tbsp. Scrambled egg, 1 Potatoes, 3–5 tbsp. Toast, 1/2 slice Sandwich, 1 slice Milk, 3/4 cup Butter, 1 tsp. Orange blanc mange, 1/4–1/3 cup	Creamed carrots, 3–5 tbsp. Potatoes, 3–5 tbsp. Toast, 1/2 slice Sandwich, 1 slice Milk, 3/4 cup Butter, 1 tsp. Tapioca, 1/4–1/3 cup	Spinach and egg, 3–5 tbsp. Potatoes, 3–5 tbsp. Toast, 1/2 slice Sandwich, 1 slice Milk, 3/4 cup Butter, 1 tsp. Prunes, 1/4–1/3 cup
2:30 Calories, 95–135	Milk, 4–6 ozs. Graham cracker	Same	Same	Same	Same
Supper: Calories, 310–400	Cream of tomato soup, 3/4–1 cup Croutons, 1–2 slices Milk, 3/4 cup Baked banana, 1	Oatmeal, 1/8–1/2 cup Toast, 1–2 slices Butter, 1/2–1 tsp. Milk, 3/4 cup Junket, 1/4–1/3 cup	Milk toast, 2 slices Sandwich, 1/2–1 slice Milk, 3/4 cup Apple sauce, 1/4–1/3 cup	Poached egg, 1 Toast, 1–2 slices Butter, 1/2–1 tsp. Milk, 3/4 cup Fruit cup, 1/4–1/3 cup	Cream pea soup, 3/4–1 cup Toast, 1–2 slices Butter, 1/2 tsp. Milk, 3/4 cup Rice pudding, 1/4–1/3 cup

Total Calories—Larger Children, 1465 Smaller Children, 1100

vegetable, usually served in a sandwich, and fruit or a dessert containing fruit. For economy, irradiated evaporated milk is recommended, especially as the problem of keeping fresh milk may be difficult. This is often an excellent economy in the home too, as pointed out in Chapter VI. It may be used as a mid-morning lunch in combination with mild fruit juice, such as prune, pineapple, orange or tomato.[1]

The 11:30 luncheons and the 2:30 feedings of milk and cracker are given to the children at the nursery school and, together with the suggested breakfasts and suppers, will adequately meet the day's food requirements of the child from three to four years of age.

[1] Recipes for these may be found in the pamphlet *How to Feed Children in Nursery Schools*, The Merrill-Palmer School (1936).

A Day's Food Plan for a Child Three to Four Years Old

Fuel Requirement: 1100–1400 Calories — Cost: 2–2½¢ per 100 Calories

7 A.M.:	Orange or tomato juice, 3 to 6 tbsp.	25–50 Calories
	Well-cooked cereal, ¼ to ½ cup	50–75 Calories
	Top milk, 2–4 tbsp.	50–100 Calories
	Milk to drink, 1 cup	170 Calories
	Toast or Dry bread, 1–3 slices	50–150 Calories
	Cod liver oil, 2 tsp.	66 Calories
12 M.:	Egg, soft cooked or Cottage cheese or Liver loaf	60–80 Calories
	Baked or mashed potato, 1 small	50–75 Calories
	Chopped vegetable, as spinach, asparagus tips, peas or carrots, 2–4 tbsp.	10–20 Calories
	Milk to drink, ¾–1 cup	130–170 Calories
	Buttered stale bread, 1–2 slices or Zwieback	75–150 Calories
	Plain custard or junket or Cereal pudding, ¼–⅔ cup	100–200 Calories
3 P.M.:	Milk, ¾–1 cup	125–170 Calories
	Bread and butter, 1 slice or Whole wheat cracker	50–75 Calories
5:30 P.M.:	Cream soup and toast or Milk toast or Cereal and milk or Baked potato and cooked vegetable with bread and butter	200–300 Calories
	Mild cooked fruit, as apple sauce, stewed pears, steamed (and warm) mashed banana	25–150 Calories

A Day's Dietary for a Child Three to Four Years Old

Fuel Value: 1348 Calories Cost: 2¼¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
7 a.m.				
Orange juice (C, B_1, G)	4 tbsp.	2.1	—	33
Cod liver oil (D, A)	2 tsp.	0.3	—	66
Wheatena (B_1)	⅜ cup	3.0	6	50
Top milk (10 oz.) (A)	2 tbsp.	1.0	5	50
Toast	1 slice	0.5	7	50
Butter (A)	1 tsp.	0.1	—	32
Milk to drink (A, B_1, G)	¾ cup	6.4	24	125
				406
Dinner:				
12 m.				
Egg (A, B_1, G) scrambled in tomato juice (C, A, B_1, G)	1 egg ¼ cup	1.9 2.2	25 3	70 15
Chopped carrots (A, B_1, C, G)	3 tbsp.	1.7	2	15
Whole wheat bread (B_1)	1 slice	0.7	8	50
Butter (A)	1 tsp.	0.1	—	32
Tapioca cream (A, B_1, G)	⅖ cup	2.8	12	100
Milk to drink (A, B_1, G)	¾ cup	6.4	24	125
				407
Afternoon Lunch:				
3 p.m.				
Milk (A, B_1, G)	¾ cup	6.4	24	125
Whole wheat cracker	1 cracker	0.2	2	25
				150
Supper:				
5:30 p.m.				
Split pea soup I[1] (B_1, A, C)	¾ cup	6.1	33	130
Whole wheat croutons (A)	12 croutons, ½″ cubes	0.6	6	80
Milk to drink (A, B_1, G)	¾ cup	6.4	24	125
Stewed apricots (A)	2 tbsp.	0.5	1	50
				385
Total for day			206	1348

[1] See Table II, Appendix.

Chapter X

FOOD FOR CHILDREN FIVE TO SEVEN YEARS OLD

ONE day the writer sat in a restaurant for luncheon beside a little girl apparently about six years old. She was just finishing a plate of hot griddle cakes and a double portion of syrup, and her mother was pouring half of her cup of coffee into a cup for the child. As the meal was finished and they rose to depart, the mother remarked to a friend accompanying them that she was taking the little girl to see a doctor—"she had seemed languid lately." Poor child! With such a luncheon even a robust adult might feel "languid." Unfortunately the retribution for dietetic sins comes slowly and insidiously, as a rule, instead of swiftly and strikingly, and the connection between an abused stomach and "bad nerves" or "temper," or other manifestations of a physical constitution below par is not impressed, if it is even suspected.

If we compare the contributions to the diet made by the griddle cake meal with those from a glass of milk, three slices one-half-inch thick of whole wheat bread, a half tablespoon of butter for each slice of bread, and a banana of pleasing dimensions, we shall quickly see how the child fed the cakes and syrup was cheated of materials essential for her health and growth, quite aside from the tax on her digestion of a pasty mixture of dough and syrup.

In Tables A and B the differences in these two meals will be easily seen, especially when we consider the values per 100 calories. The milk, bread and fruit meal has an ample allowance of calories for a six-year-old girl and at the same time it furnishes six times as much calcium, five times as much iron, and far better supplies of all the vitamins. Yet this meal is no richer in these es-

Table A

	Measure	Total Calories	Protein Calories	Calcium Grams	Phosphorus Grams	Iron Grams	Vit. A Units[1]	Vit. B1 Units[1]	Vit. C Units[1]	Vit. G Units[2]
Griddle cakes	3 cakes	300	42	0.09	0.13	0.0009	345	6	—	48
Syrup	6 tbsp.	400	—	—	—	—	—	—	—	—
Total		700	42	0.09	0.13	0.0009	345	6	—	48
Per 100 calories		100	6	0.01	0.02	0.0001	49	1	—	7

Table B

	Measure	Total Calories	Protein Calories	Calcium Grams	Phosphorus Grams	Iron Grams	Vit. A Units[1]	Vit. B1 Units[1]	Vit. C Units[1]	Vit. G Units[2]
Milk, pasteurized	½ pint	170	32	0.29	0.23	0.0006	386	28	50	78
Bread, whole wheat	3 slices, ½″ thick	200	30	0.04	0.12	0.0014	—	124	—	28
Butter	1 tbsp.	100	—	—	—	—	384	—	—	—
Banana	1 large	100	5	0.01	0.03	0.0006	178	15	170	30
Total		570	67	0.34	0.38	0.0026	948	167	220	136
Per 100 calories		100	12	0.06	0.07	0.0005	167	29	39	24

[1] International units. [2] Bourquin-Sherman units.

sentials for the best growth than every meal of every day ought to be. In child-feeding, good intentions are no substitute for knowledge. An excellent illustration is afforded by a famous dietary study made in a colony of 500 English boys by Dr. H. C. Corry Mann.[1] They were housed in a model settlement "in a healthy spot" eleven miles from London. Sleeping and living accommodations were excellent and the diet was believed to be adequate. But a four-year study of the effect of supplementing it with extra calories in the form of sugar or margarine, or with extra vitamin A as butter or watercress; or with extra protein as the casein of milk showed that this diet was far from ideal. The weight of the boys was improved somewhat by every one of the additions, but its deficiencies were manifold. This is shown by the fact that a pint of milk a day caused the most remarkable improvement in health and growth. Dr. Mann says in reporting his findings: "It is startling to learn, as we do now, that the addition of one pint of milk a day to a diet which by itself satisfied the appetite of growing boys, could convert an annual gain of weight of 3.85 pounds to 6.98 pounds and an average rise in height from 1.85 inches to 2.63 inches per boy." The boys were not only larger but they were "obviously more fat" than those in any other group.

In the United States we have also much evidence to-day of the improvement in health and growth of children when their "hidden hunger" is provided for. At the University of California Dr. Agnes Fay Morgan fed a group of school children just two extra rolls a day. For half the children these were made of white flour, and for the other half, of a mixture of equal parts white flour and wheat germ. The increase in weight of the wheat germ group was approximately three times that of the white rolls group and gains in height, though not so striking, since the experiment lasted through only one school term, were significantly greater in the wheat germ group.

Improvement in nutrition on an improved diet is revealed very strikingly by studies of the condition of the teeth. One outstand-

[1] Mann, H. C. C. *Diets for Boys During the School Age*, British Medical Research Council, Special Report Series No. 105, His Majesty's Stationery Office, London (1936).

ing demonstration of the relationship between teeth and food was made in two rural towns in Massachusetts, involving 400 school children. In one district the prevailing industry is dairying; in the other, almost all milk was imported even for domestic use. Careful examination of the teeth and diet of the children showed that in the township which had its own good cows and used milk freely, the children's teeth were much stronger and freer from defects, while those who had a diet in which milk was very sparingly and intermittently used, had much poorer.

Other studies have shown that dental caries may actually be arrested by improvements in the diet. Dr. Bunting and his associates at the University of Michigan treated five large groups of children for nearly a year. Two groups were given a good diet and also a mouth wash after meals; one group a good diet only and another group the mouth wash only; the fifth group was kept on the regular diet of the institution in which the children were living. In the groups whose diet was improved, active dental caries was almost completely arrested, while in the group with the mouth wash only there was evidence of more caries than at the beginning of the study. Other evidence of the value of a good diet for the best tooth health comes from the State University of Iowa, where Drs. Boyd and Drain found that in the University hospital there were a number of children with arrested caries. These proved to be diabetic children, whose carefully supervised diet was rich in minerals and vitamins. When a group of non-diabetic children was placed on the same diet, there was a definite hardening of the teeth after a few months. The diet which they recommended includes a quart of milk, an egg, an ounce of butter, a teaspoon of cod liver oil (all the year through), two vegetables, one raw, and fresh fruit. It is interesting to note that parents who had insisted that their children were having just this sort of diet, found by keeping actual records of what each child ate that this was not the case, and that when the diets were really carefully supervised and the prescribed foods were eaten, a striking arrest in dental caries occurred. As Dr. Roberts of the University of Chicago says, "The simplicity of such a feeding plan should commend itself to every parent. If we could but do

Children, like flowers, thrive best when they have besides the right kind of nourishing food and care, plenty of sunshine and out-of-door air.

this relatively simple task for the children under our guidance continuously throughout their development period, we should reap a rich reward in the way of a greatly improved generation of children and adults. It is safe to say, moreover, that this improvement would be especially marked in respect to the teeth."[1]

Sunshine and rest are important aids to the utilization of food by children. We must not be content merely with supplying them good food. We must safeguard them against fatigue. There must be long hours of sleep and not too much excitement or hard work during the waking hours. We must free them from physical defects which cause malnutrition by interference with normal breathing (enlarged tonsils and adenoids) or by poisons derived from diseased teeth; we must see that there is no latent tuberculosis or other bacterial disease handicapping their progress. All through childhood, weighing should be done at regular intervals and tables of weight and height of normal children consulted[2] as an aid in judging of progress and these should be supplemented by thorough physical examination at least once a year.

Each stage of development calls for watchful care. Good health habits must be fixed, and even adults are known to lapse from good habits started in early life. How much more the irresponsible child from five to seven! We must not only help him to remember to drink water, to attend to his bowels at a stated time, to go to bed and eat meals by the clock, to keep clean, to maintain a good posture, but we must impress the desirability of all these things upon his mind. More and more we must teach him that the building of a strong body is governed by laws which he must respect. Especially in these years must we inculcate the idea that food is to be chosen for what it will do for our bodies, and that as a general proposition we must learn to like what we ought to eat.

Feeding during the fifth, sixth, and seventh years differs little

[1] Roberts, L. J. "Scientific Feeding of Children," *The Journal of the American Dental Association*, Vol. 21, pp. 44-57 (1934).

[2] See Appendix, Tables VI and VII.

from that for the fourth year, except in the increasing quantity required to meet the needs of the larger child. All the kinds of nutritive material essential to growth have already been introduced into the dietary—milk, eggs, cereals, fruit, green vegetables, stale bread; supplemented by butter, cream, potatoes, and, in certain dishes, a little sugar for flavor. It is still wise to give one teaspoonful of cod liver oil daily, especially in the winter months. All food should still be served as simply as possible. Much of the quart of milk which ought to be the foundation of the diet can be drunk; the rest used in simple soups, desserts, or plain cream sauces for vegetables. For variety, especially on cold days, the appearance of milk as a beverage may be changed by heating with a little malted milk; by cooking with just enough cocoa to give color and flavor; or by coloring with a cereal coffee. The addition of a spoonful of whipped cream to one of these modified forms may glorify it into a very special treat for some birthday or holiday. No tea, coffee, or strong cocoa should ever be given to children. A welcome addition to the simple desserts during this period will be various homemade frozen dishes, such as milk sherbets and plain ice cream. These should not be served oftener than once a week, being too sweet for staple desserts; and in very moderate quantities on account of their coldness. Ice creams made from thick cream are too rich for little children. The frozen dish should be regarded chiefly as another means of making milk acceptable in the dietary by a simple change in its form. Lemon or orange milk sherbet, cocoa or junket ice cream, or a plain frozen custard of milk and eggs are the most suitable choices.

Cereals should still be served without sugar, but with plenty of milk. The warm cooked cereal should always be the staple breakfast dish, dark cereals being served more frequently than light. Cereals with added vitamin B_1 are now available and are excellent when their higher cost is not a serious matter. In rural districts wheat germ may sometimes be purchased at a local mill and a small portion added to any breakfast cereal, or it may be purchased in cans, the cost varying with the way it is marketed. The ready-to-eat cereals can well be served for supper or for

especially hot days in summer; eaten dry and crisp instead of bread, they make a suitable lunch if the child is hungry in the middle of the afternoon; he is not likely to fail to chew such fare or to overeat of it.

Raw fruits, except in the form of juice, should be introduced into the diet cautiously. Perfectly ripe pears, peaches, and apples, are the best to experiment with, but for the most part the fruit should be cooked, and especially any given for supper. Dried fruits, such as peaches, and prunes, are very valuable, especially when the cost must be limited. With the exception of peeled apricots they all need long, slow cooking and little or no added sugar. Dates may be stewed in a little water and put through a sieve to remove the coarse outer skin, then flavored with a little sugar and lemon juice. Bananas are best cooked for young children, baked in their skins or steamed in a covered vessel in a very little water. Care must be taken in baking not to let the juice ooze out, as it will if they are cooked too long. If this happens they will be tough and unpalatable. If properly ripe (showing a few black "freckles" on a yellow skin) they will not need water nor sugar. Perfectly ripe bananas may also be cut in small cubes and covered with orange juice to make a well-liked dessert. Preserves of all kinds and very sweet canned fruits must be avoided.

With orange or tomato juice once a day, potatoes daily and some variety in the other fruits and vegetables there need be no concern about shortage of vitamin C. Green vegetables should still be cooked and care taken to see that they are well masticated. The addition of a plain cream sauce now and then will give variety to the menu and add to the nutritive value of the vegetable dish. A cream sauce to which a little tomato juice or mild grated cheese has been added poured over crisp toast or soda crackers makes an attractive supper dish.

Potatoes should always be mealy. Baking is the safest method of cooking, but plain boiled and mashed potatoes are not objectionable if not over-cooked or allowed to stand about after cooking before they are served. Fried ones must never be offered.

The temptation to add hot breads, biscuits, rolls, waffles,

griddle cakes, and the like must be steadily resisted. Only bread stale enough or hard enough to offer exercise in mastication should be given. Breadsticks, crisp to the center, or sippets, made by toasting narrow strips of bread in the oven, will be welcome for variety.

Butter, cream, and bacon fat in moderation are valuable in the child's diet. But the butter should be spread on bread rather than used in cooking; cream should be thin and used preferably over cereals, toast, and simple desserts. Bacon fat may be added to baked potatoes or spread on bread.

Occasionally a small serving of plain, hard cookies or graham, whole wheat, or other crackers may be given at the end of the meal. Soft cake should not be given at all.

When the functions of foods were far less well understood than they are today, more emphasis than the facts justify was placed upon meat in the young child's dietary. We now know that a diet of whole wheat bread and milk, with no other addition but a small amount of common table salt will not only support growth of experimental animals through as many as forty-six generations, but that the last members of the family will be more vigorous—larger and stronger than the first generations. On a diet of bread and meat there is good growth for a period corresponding to about two years in the life of a child but after that the animals decline in weight, become wretched in health and if not put on a better diet soon die. There is never any second generation. On egg and bread there is nearly as good growth as on milk and bread, and a vigorous second generation can be obtained. Such experiments have made very clear the relative value in the diet of these different foods. Since meat is of no special value for growth when the diet is adequate in protein (as it will be with a good supply of milk) there is not much room for it in the diet of the young child after suitable amounts of vegetables, fruits, eggs, and cereals have been provided, and there is danger that meat, with its higher flavor, will make these blander foods seem less attractive, just as sugar tends to do.

Besides the fact that meat lacks calcium and vitamins, so essential to growth, it is more liable to intestinal putrefaction

than milk, and hence is a less desirable source of protein, for the products of putrefaction have a deleterious effect upon health. The tendency to produce them appears to be greater in the young child than in older persons, children of three or four showing more signs of putrefaction on a diet of which meat is a regular part than do children of six, and these in turn more likely to do so than children of eight. Milk feeding will cause the signs of putrefaction to disappear so the advantage again is decidedly with the milk.

It used to be thought that meat was indispensable for protein and also for iron. Now we know that milk proteins are equally efficient for growth and that so-called "milk anemia" is not due to anything more than a lack of copper and some additional iron, which can be supplied in green vegetables, certain fruits such as apricots and pineapple, egg yolk, and whole wheat, which are also valuable for other reasons.

When an arctic explorer lives on "nothing but meat" it is worth while to remember, first that he is a full grown adult and has no marked need of the growth-promoting factors upon which emphasis must be laid in childhood, and second that his so-called meat diet is not steaks, roasts, and chops as ordinarily eaten, but a diet with a moderate amount of protein (120 grams or so per day) and the rest fat, derived from liver, kidney, and other parts which contain the vitamins essential even to adult health.

If the traditional feeling that meat has special virtues cannot be overcome by consideration of scientific facts, the substitution of a little liver is a good way to appease the Moloch of tradition! A small amount of meat, superimposed on an excellent diet, will do no harm, but one further point regarding any extensive meat consumption by young children is perhaps worthy of mention. The stimulating extractives in meat, which may be quite useful to a jaded adult, should not be used to whip up the sensitive growing organism, which when healthy is far better off without stimulants of any kind. The two chief advantages of meat are that it requires mastication and exercises the chewing apparatus and that it is one more good source of iron. But, as already shown, dry bread makes excellent chewing material, with none

of the disadvantages of meat. Excepting the point in regard to mastication, what is true of meat is true of beef juice. Its use is best restricted to babies who for some reason cannot have an adequate supply of milk, egg yolk, liver pulp, and fruit juice, or who are sick enough to need a stimulant. The chief merit of meat broths seems to be to induce the eating of cereals or vegetables which may be cooked in them, and this can usually be accomplished in some other way. Broths almost inevitably limit the amount of milk taken, and do not seem in any way to justify the regard in which they have been held in the past as a food for children. It appears unkind to put a busy housewife to the trouble and expense of making them when there is so little to be gained thereby.

The average weight of normal children for the fifth, sixth, and seventh years and the energy requirement per pound of body weight per day are, in round numbers:

ENERGY REQUIREMENTS FOR FIFTH, SIXTH, AND SEVENTH YEARS

YEAR	WEIGHT IN POUNDS (FOR MEDIUM HEIGHT)	CALORIES PER POUND
Fifth	41	36–38
Sixth	45	35–37
Seventh	50	34–36

It seems advisable in these years of comparatively rapid growth to allow from three to four protein calories per pound per day; though probably somewhat in excess of the actual requirement, it is well to have a liberal supply for periods of rapid development.

The same scrupulous care in regard to regularity of meals must be continued. Usually breakfast will now be given at 7 or 7:30; a very simple mid-morning lunch not later than 10:30; a substantial dinner at 12 or 12:30, and a plain supper at 5:30 or 6. During this period many children begin going to school, and the meal schedules must be adjusted to the school schedule. Especial care needs to be taken that breakfast be provided in time to be eaten without haste or fear of being late to school, and with time

for a bowel movement afterwards. No child should be permitted to go to school without breakfast. The pangs of an empty stomach will cause him to feel fagged out long before the next meal, which in some schools will be the noon one. He will then be likely either to be over-hungry and eat hurriedly to the upset of his digestion, or to have lost the feeling of hunger and refuse a rational meal. In any case, considering the amount of fuel a child must take to keep his machinery going and to have a surplus for growth, he cannot afford to miss breakfast with the hope of making good the loss later in the day. Numerous studies of school children show that no breakfast and malnutrition are commonly found together. The young child going to school should have there a mid-morning lunch, to take the place of the one which he has formerly enjoyed at home. It should be of the simplest character; a glass of milk or of orange juice and a cracker, a bowl of cereal and milk or even an apple being quite sufficient. Such good results have followed the introduction of these mid-morning lunches—gains in weight, improved general health, and better school behavior—that they are now a part of the regular school program in many places, and mothers may find that they can render useful public service in extending the practice where it is not in vogue.

When there is no opportunity for a morning lunch, the dinner must be served early—preferably at noon—and then a light lunch may be given in the afternoon, similar to that suggested for morning, at 3 or 3:30. During the first school years the child has many new conditions to meet, such as the excitement of going away from home and mingling with a large number of persons, and the change to a schedule involving hours of confinement, and no extra strain should be put upon him in the way of caring for difficult food. He needs more than ever to be safeguarded against unsuitable food, or food at unsuitable times, to which his school companions and surroundings may tempt him, and against eating when exhausted or greatly excited by his work or play. Regularity, simplicity, and serenity are good dietetic watchwords; good health has economic and social as well as personal value, and in these early years the foundations for it should be most carefully laid.

A Day's Food Plan for a Child Five to Seven Years Old

Fuel Requirement: 1400–1700 Calories — Cost: 2–2½¢ per 100 Calories

Breakfast:

7–7:30 A.M.	Orange juice or Tomato juice or Pineapple juice	50–100 Calories
	Well-cooked whole grain cereal	50–100 Calories
	Milk	150–200 Calories
	Dry toast or stale bread	50–100 Calories
	Butter or Cream or Bacon fat	25–50 Calories
10–10:30 A.M.	Milk	125–175 Calories
	Bread	50–75 Calories
	Butter	25–50 Calories

Dinner:

12:30 P.M.	Egg or lean fish or beef or lamb or chicken or minced liver	50–75 Calories
	Chopped vegetable, as spinach, peas, string beans, carrots, broccoli	10–25 Calories
	Baked potato or boiled rice or Baked banana	50–100 Calories
	Whole wheat or rye bread	50–100 Calories
	Butter	50–100 Calories
	Milk	100–150 Calories
	Stewed fruit or plain pudding	100–200 Calories

Supper:

5:30–6 P.M.	Peanut butter sandwiches and milk or Creamed vegetable on toast or Milk toast	250–400 Calories
	Stewed fruit, custard, or junket, with or without plain cookies	100–200 Calories

A DAY'S DIETARY FOR A CHILD FIVE TO SIX YEARS OLD

Fuel Value: 1667 Calories — Cost: 2-2¼¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
7:30 A.M.				
Tomato juice (C, A, B_1, G)	⅝ cup	5.9	7	40
Oatmeal (B_1)	½ cup	4.0	8	50
Milk to drink (A, B_1, G)	¾ cup	6.4	24	125
Milk for cereal (A, B_1, G)	1/7 cup	1.2	5	25
Toast	2 slices 3 in. x 3½ in. x ½ in.	1.0	14	100
Butter (A)	½ tbsp.	0.2	—	50
				390
10:30 A.M.				
Milk (A, B_1, G)	⅝ cup	5.1	19	100
Whole wheat crackers	2 crackers	0.4	5	50
				150
Dinner:				
12:30 P.M.				
Eggs à la goldenrod[1] (A, B_1, G)	1 serving	5.7	51	286
Broccoli (A, B_1, C, G)	½ cup	2.4	9	25
Scalloped tomato (C, A, B_1)	⅕ cup	1.5	3	30
Creamy rice pudding	½ cup	4.1	24	193
Milk to drink (A, B_1, G)	½ cup	4.3	17	85
				619
Supper:				
5:30 P.M.				
Cream of baked bean soup (B_1, A)	½ cup	3.9	15	100
Croutons (toasted)	27 croutons	1.4	14	100
Butter for croutons (A)	½ tbsp.	0.2	—	50
Milk (A, B_1, G)	¾ cup	6.4	24	125
Stewed prunes (B_1)	6 small	2.8	2	100
Molasses cookies I[1]	1 cooky 2 in. diam.	0.2	2	33
				508
Total for day			236	1667

[1] See Table II, Appendix.

Chapter XI

FOOD FOR CHILDREN EIGHT TO TWELVE YEARS OLD

By the time most children are eight years old they are established in the school-going habit. Some of the problems of nutrition which arise when they first change from a life of comparative freedom and of much time out of doors to one of restraint and too often, alas, of little fresh air, have been mentioned in the preceding chapter. The years when the rate of growth is most rapid and the digestive tract most sensitive now are past, and errors in diet are followed by less swift retribution, so that there is a temptation to relax the vigilant care of the child's food and leave him to his own devices. But this is a great mistake. The period of physical development in a human being covers nearly a quarter of a century, and the seven-year-old child has climbed less than a third of the hill of growth. We attend to his clothing and shelter—how much more important to see that he has proper food!

Fortunately we now have some communities which maintain, either through public or private agencies for conserving and developing child health, a school physician for periodic health examinations and general supervision, a school nurse to assist the physician and attend to the correction of hampering physical defects, a dentist to care for the teeth, and a nutritionist to supervise the children's food, assist the teachers in giving instruction in regard to food and its relation to health and enlist cooperation of the homes in a good health program. With increasing care of the pre-school and kindergarten children, there should be less to do in succeeding years, nevertheless children between eight and twelve carry little reserve material in their bodies and their food must literally meal by meal yield liberal amounts of fuel and

body-building material if they are to grow rapidly taller without becoming so far underweight as to menace health and future growth. They need to be interested in taking care of themselves and learning to choose their own food intelligently. There is probably no school period in which the returns on such instruction are greater. Weekly weighing and charting of each child's progress have proven a valuable stimulus to effort on the part of many children and definite lessons about food should be a part of the school program.[1]

Whether food education be carried on in the school or not, it certainly should be in the home. There are now available many helps for fathers and mothers whereby they may interest and instruct their children in regard to food in addition to training them by precept and example in good eating habits. If a child has a persistently poor appetite which cannot be cured by plenty of rest and sleep and a suitable feeding schedule, he should have a thorough physical examination to determine the cause.

According to the principle already laid down, the comparatively simple diet of the seventh year is to be gradually extended. Only a few well-chosen dishes need be offered at any one meal, but a tendency to choose a single dish for a meal and refuse everything else should be discouraged. In adult life a well-balanced diet demands more kinds of food than in childhood, when such a variety of elements is supplied by milk alone, and it is a great advantage to have been so trained as to be able to take these in all sorts of forms. Most adults eat in groups and pronounced individual likes and dislikes have great economic and social, if not always physiological, disadvantages. Half the problems of the food provider arise, not from the difficulty of securing wholesome food to make a well-balanced ration, but from the necessity of remembering that Mr. Jones will not touch fish, Mrs. Smith never eats cabbage, and Mr. Brown must always have apple pie for supper! Youth is the time to cultivate respect for all natural foods as a means to physical and mental efficiency, and not merely as ticklers of the palate. Disparaging

[1] For discussion and reading references consult *Nutrition Work with Children*, 2nd edition. Roberts, Lydia J., University of Chicago Press (1935). See also *Teaching Nutrition to Boys and Girls*, Rose, M. S., The Macmillan Co. (1932).

remarks about wholesome food should never be permitted, for it must always be borne in mind that eating has psychological as well as physiological aspects, and children are quick to catch the notions of those with whom they associate. If mother plainly turns up her nose at milk and cereals and bread and butter, how can she expect the children to relish them? Most food aversions are acquired in early life when the sensibilities are keenest. An accident at the table with humiliating consequences, an unpleasant association of a food with illness, a comparison with something disagreeable, may cause repugnance lasting for years. Such aversions, once acquired, call for patience and tact and may never be completely overcome. It is a part of the feeding problem of childhood to prevent such misfortunes. Table conversation should deal with topics other than food, and when disturbances arise at the table eating should be stopped until tranquillity is restored. Food taken in grief or anger has a poor chance of fulfilling its proper mission. If a child refuses a food really essential to his welfare, hunger will often do more to reëstablish his taste for it than commands or threats. New dishes or appeals to the imagination are often helpful in holding children to their proper diet. A glass measuring cup for milk has often inspired interest in the quantity drunk. One mother set her two children to running "calorie races" when they were below normal weight, with decided improvement in the quantity of food taken. It is worth while to take thought how to keep children's attitude toward their food rational.

Feeding from the Eighth to the Twelfth Year

A quart of milk, continued as the basis of the diet, will give relief from much concern as to whether it is well-balanced or not. For breakfast cooked whole grain cereals or those with added wheat germ or otherwise reinforced with vitamin B_1 should be given the preference, the ready-to-eat varieties being reserved for occasional use because the warm, full-flavored porridge is less likely to be tired of. The ready-to-eat cereals are not usually good carriers of vitamin B_1 unless it is added in the process of manufacture, as it is largely destroyed by the high temperatures to

which they are subjected. Dry cereals absorb large amounts of milk and their texture affords a pleasing change. When their lost vitamin B_1 is restored they can be used as freely as their greater cost over home-cooked cereals justifies.

By the eighth year, raw fruits can be used more freely, only the strongly acid ones being forbidden. For the evening meal preference should be given to cooked fruits, moderately sweetened. Jellies may be spread lightly on bread now and then, but preserves should be withheld. Peanut butter is an excellent spread for bread. Its protein is efficient for growth, it has a good supply of vitamins A, B_1 and G and a single tablespoon furnishes 100 calories at low cost. Sweetened condensed milk is also an excellent spread for bread when a sweet one is desired. Sandwiches are popular and the diet can be improved by selecting suitable fillings.

Dates, figs, and raisins are valuable additions to the diet now. Dates and figs should be thoroughly washed and drained, after which they may be heated in an oven to dry and sterilize them, then cooled and packed in jars for future use. Figs are best stewed in a little water, and require no sugar. With cream, they make an acceptable dessert. Raisins should always be cooked. They may be simply stewed and served as a sauce, or used to vary the flavor of other fruits, especially of dried peaches and apricots, added to bread, rice, and other cereal puddings, or baked in raisin bread. Their high fuel value, rich ash content, and sweet flavor make them very valuable in children's dietaries. Dates are often used to vary the appearance of the breakfast cereal, being cut up and stirred in a few minutes before serving. They can also be used in puddings and bread like raisins.

The child may now be expected to eat any mild, thoroughly cooked, green vegetable, and one should be provided, if possible every day. Pains should be taken to cook vegetables so as to develop their best flavor and conserve their minerals and vitamins. Much of their unpopularity is due to bad cooking and lack of education as to their significance for growth.

Raw vegetables should now be made a more important part of the diet, beginning with a little tender lettuce, or cabbage very finely shredded, or grated carrot. A little orange juice makes

a good dressing for such a "salad." A little later finely cut celery, apple, and other fruits can be added. The habit of eating some crisp raw vegetable daily is a good one to establish, but care must be taken to see that such food is properly masticated; and highly seasoned salad dressings of all kinds should be absolutely avoided.

Raw vegetable sandwiches made of whole wheat are eagerly chosen after the children have learned in school how important raw carrots and raw cabbage are for the health of a guinea pig in their care; and how white rats fail to grow on diets lacking vitamin B_1. Raw spinach and cottage cheese sandwiches are not only a good source of calories and protein but also of vitamin A and vitamin C.

Butter is an excellent source of vitamin A, and nowadays butter substitutes equally rich in vitamin A and usually much cheaper, make it possible for more children to have this health protection.

By the time a child is eight or nine years old, meat may be more regularly introduced into the diet. It should not be allowed to displace milk, but used to supplement it. Lean beef, mutton, lamb, chicken, lean fish, such as halibut and cod, or oysters are most suitable for this period. Fat meats or meats cooked in fat or served with rich gravies or sauces should be avoided, as too difficult of digestion. A small portion (about an ounce) is adequate and that not oftener than once a day. At the other main meal cheese or eggs or various combinations of these make substantial dishes.

Children are generally fond of sweets, but their importance is commonly exaggerated. Children in whom the taste for sugar has not been cultivated do not exhibit a marked craving for sweets. They may even object, like a fine big boy of eight who took exception to a mid-morning lunch of zwieback of a common sweetened variety, complaining, "It's too sweet! It's too sweet!" In any case sweets should never be given between meals nor at the beginning of any meal. Not only candy, but the delectables of the soda fountain and ice cream parlor, are out of place for anybody except at the end of a regular meal, and even then are not de-

sirable for children. The less they know about such sweets the better.

Sugar is a valuable fuel food, but with its high flavor and rapid diffusibility it is likely to satisfy the appetite before body needs are really met, if given at the beginning of a meal; and it is not only likely to disturb the normal appetite, but seriously to upset digestion if taken between meals; while in large quantities at any time it irritates the stomach and displaces foods which serve for building and regulating material as well as fuel. Candy is too concentrated to be an ideal food. If greatly desired a very small amount may be given at the end of a meal, when it will be diluted by the other food and do no particular harm, provided the teeth are thoroughly cleansed afterwards. If has been found that one disposing factor to dental caries is sugar. The practice of holding hard candies in the mouth has been found to cause deterioration in the teeth. This is a local effect quite aside from the bad effect on the nutritive value of the diet of introducing a food with no protein, minerals or vitamins. Rich confections from chocolate and nuts are too difficult of digestion. Plain sweet chocolate is a good substitute for candy if used in small amounts and if it does not keep the child awake at night, but best of all are the sweet fresh and dried fruits. Gingerbread and plain cookies also satisfy the taste for sweets, and ice creams and milk sherberts can be used now and then for the same purpose.

Nuts in their natural state or salted are not easy to masticate, and on account of their high fat content are rather slow of digestion. Hence they do not enter into the dietary of little children. Peanut butter, as already stated, is an excellent food. Peanut butter soup has high nutritive value when made with milk and may have tomato added for vitamin C. No fried food, pastries, tea or coffee, rich sauces, or meat salads with mayonnaise dressing should ever be offered to young children.

Three regular meals a day will now suffice for many children, but if breakfast is light or the child is very hungry between meals, a simple mid-morning or mid-afternoon luncheon may still be provided. It should not be given if it interferes with zest for the

regular meals, and it should never be sweet, so as to tempt the child to eat when not really hungry. Dry bread, crackers, milk or fruit juice are best. Mild fresh fruits are allowable if the child is well and strong. This extra mid-morning or mid-afternoon lunch is often served at school, where it generally consists of a half pint of milk and a cracker or two. Orange juice has been found a beneficial school lunch, if not prohibited by cost. Such feeding should not supplant the home breakfast or noonday meal, but it may be a valuable supplement to either of these. It is particularly valuable for the children in the early years of school life, and is often a great aid in bringing underweight children into better condition. Teachers report not merely gains in weight but better behavior and better school progress after the institution of milk feeding. Incidentally, it is of value in teaching children to drink milk. The desire to do like the rest overcomes prejudices which may fill the child's whole horizon at home.

Dinner should be served at noon rather than at night, to insure early and peaceful slumber. Many children have to take the noon meal at school, however; in the country because they live too far away to go home at noon; in the city among the poor because the mother goes away to work and there is no one to prepare a noon meal, or among the well-to-do because the single school session often extends beyond what should be the dinner hour. The luncheon of the school child, therefore, deserves special consideration. Where the school authorities give it no attention, the children usually take their food from home. In this case they lose the advantage of warm food in promoting easy and rapid digestion, and their minds are not so clear for the afternoon work. They are also more likely to bolt their food when not eating at a table with other people. If, then, a lunch box must be carried from home, special thought should be given to the selection of food, so that it may be suitable in kind and amount, and appetizing when the box is opened. Three or four kinds of food are quite enough to provide at a time, for at best the busy housewife usually finds her wits taxed to furnish wholesome lunches with much variety.

Plan for the School Lunch Box

1. *Sandwiches* are the great staple, easily portable and generally liked. The bread should never be less than twenty-four hours old, lightly buttered and filled with finely chopped boiled eggs carefully but mildly seasoned; a nut paste, such as peanut butter, preferably softened by working in a little milk or cream; a dried fruit paste, made of chopped dates, figs, or raisins, or a mixture of these; or raw vegetables chopped fine and seasoned with a little orange or lemon juice or vinegar, salt and sugar. An occasional chicken liver may be set aside for lunch box sandwiches. For the older children, chopped meat, cheese of various kinds and especially cottage cheese (often most acceptable in combination with jelly) are also desirable. Sandwiches of raisin or date bread without other filling than butter or a butter substitute with added vitamin A, or of plain bread with a peanut butter and raisin filling will help to give variety and many calories.

2. *Fruit* is appetizing and carries well. Its succulent qualities make it especially acceptable with the rather dry sandwich. Not only fresh ripe fruit, but also apple sauce, stewed raisins, figs, pears, peaches, etc., can often be carried by a little forethought in securing small jars with tight-fitting covers. Paper cups designed for jelly with close-fitting tops are practicable for this purpose. Ripe tomatoes are juicy enough to take the place of other fruit for the older children and their richness in vitamins makes them as valuable as oranges or when fruit is not plentiful, or for variety, tender raw carrots cut in strips are an excellent substitute.

3. *A sweet* of some kind should be included, such as plain cookies of various sorts, gingerbread or sponge cake, baked custard, a piece of sweet chocolate, or a few dates rolled in sugar.

4. *Some fluid* to drink with the meal aids digestion and should always be provided. Water will serve, of course, but milk will add to the food value and so will fruit juices, if they can be carried.

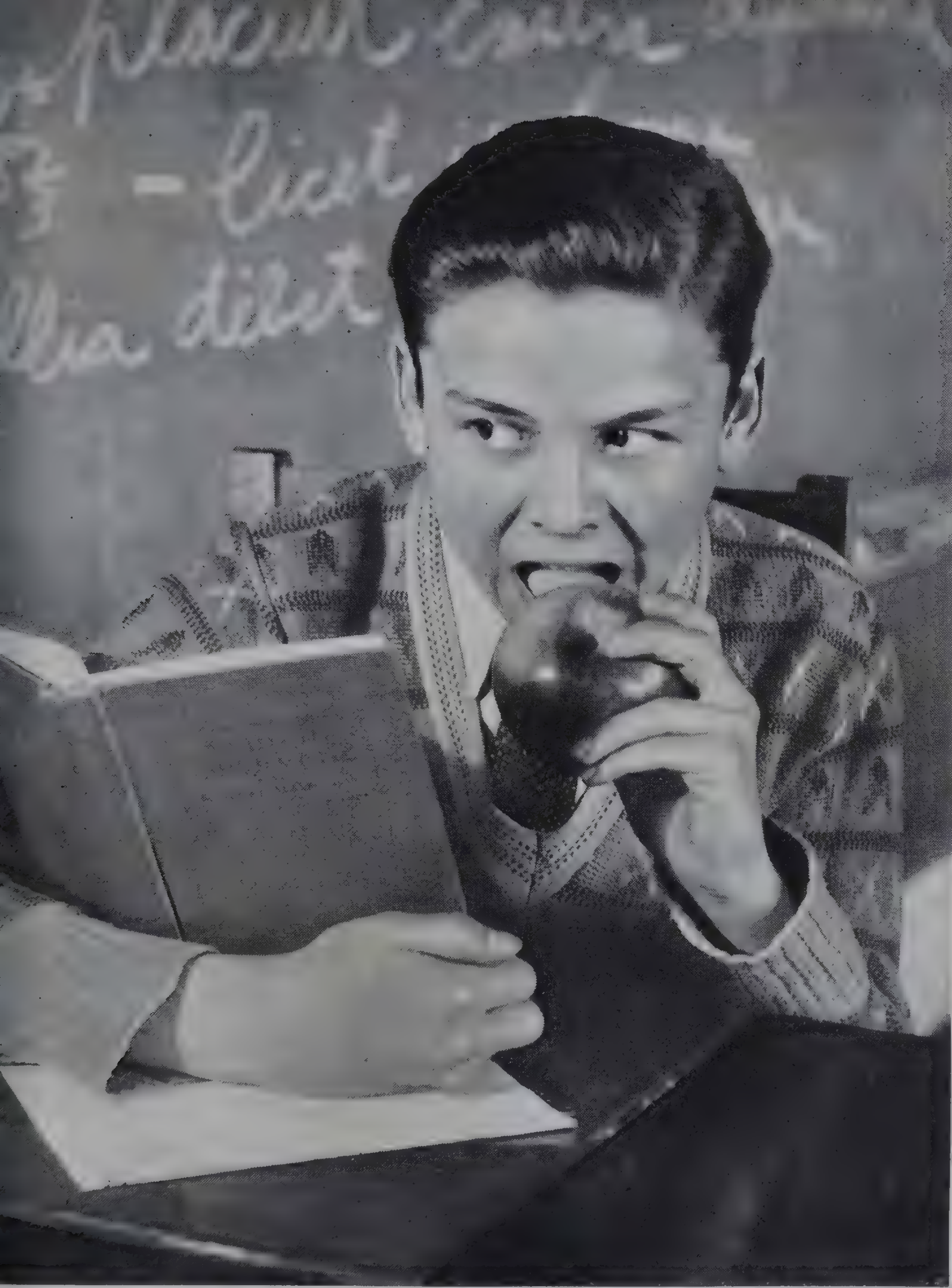
Plenty of waxed paper to wrap the different kinds of food and keep them from flavoring each other should be kept on hand; this is one of the big secrets of a tasty lunch box.

The School Lunch

At its best, however, the lunch box must be regarded as a makeshift. A regular school lunch, shared by teachers and pupils, has tremendous advantages. If only one hot dish—perhaps soup or cocoa—can be provided at school to supplement what the children bring from home, it draws the pupils together socially, so that the meal is taken in a more orderly fashion, and experience in hundreds of rural schools shows that it results in improved physical condition of teachers and pupils. When they leave home early in the morning, travel a considerable distance in the cold, and return only in time for supper, the cold food carried in their boxes would often be really insufficient for their body needs, even if it were in the best form. Studies of rural conditions have shown that country children tend more than city children to be below par physically; and this is certainly not because country life does not offer opportunity for good development, but because country dwellers often fail to realize that they must take advantage of the fresh air and wholesome food which are theirs to command. The realization of what good feeding means for physical and mental development results not only in careful provision of food for the meals at home, but coöperation with school authorities in securing protection from bad feeding at the noon hour.

The expensive machinery of education is wasted when it operates on a mind listless from hunger or befogged by indigestible food. Whether the cause be poverty, ignorance, or carelessness, the child is the sufferer, and the painstaking work of the school lunch supervisors to secure wholesome and adequate noon meals for the school children at a minimum cost not only brings immediate benefit to the children, but exerts a widespread influence upon homes and parents, as the children carry to them reports of these concrete lessons in the science of proper selection, preparation, and hygiene of food. All school lunch work should be considered educational and should be an important factor in teaching the children the best food habits.

To meet the food needs of needy children during the depression years since 1931, New York City has had an Emergency Relief School Lunch Service providing over 90,000 free lunches daily.



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"You cannot fill the head when the stomach is empty."—Holt, *Food, Health and Growth*

These have of necessity been of the simplest character and the actual cost of the food has been about two-thirds of a cent per 100 calories. The general scheme has been to include one hot dish, such as spaghetti with tomato sauce; a substantial soup or "vegetarian beans" (cooked without meat or animal fat); a whole wheat bread and butter sandwich; a white bread sandwich with an appetizing filling such as egg and celery; one-third of a quart of milk; and fruit either fresh or cooked, chocolate pudding or ice cream. Legumes and grains, barley, oatmeal and cornmeal are used to thicken soups in order to supply added minerals and vitamin B_1. Likewise in the chocolate pudding whole wheat is used as thickening instead of cornstarch. To induce children of all nationalities, with all sorts of food habits and prejudices, and the poor appetite which accompanies undernutrition to eat these lunches has been a large educational task. The mother who struggles to teach one child to enjoy the foods essential for his well-being might be comforted by the fact that other children do not immediately crave food which is good for them. The Directors of Homemaking who have charge of these lunches say, for instance, "At first vegetable soup was very much disliked. Many left it, others hid their soup bowls under the desks or tables, while still others would carefully spoon the liquid leaving the vegetables. *But soup finally became a favorite part of the lunch.*"[1]

With very simple equipment, it is possible to serve one appetizing and nourishing hot dish, a glass or two of milk, fruit or some uncooked vegetables, such as tomatoes or carrots, and bread and butter or some kind of sandwiches. Menus built around this plan as suggested for a typical meal by Dr. R. S. Carpenter and collaborators at the Bureau of Home Economics, U. S. Department of Agriculture, are given below:

School Lunch for One Week

I	II
Eggs and rice in tomato sauce	Cream-of-potato soup
Whole-wheat bread-and-butter sandwich	Peanut-butter sandwich
Fruit	Fruit and cookie
Milk	Milk

[1] *Practical Home Economics,* General Results of Emergency Lunches from the Nutritional Standpoint. Westfall, M. and Adams, J. M., Vol. 10, pp. 280, 298 (1932).

III
Meat and vegetable stew
Bread-and-butter sandwich
Fruit
Milk

IV
Lima beans and tomatoes with bacon
Whole-wheat bread-and-butter sandwich
Fruit
Milk or cocoa

V
Creamed salmon with noodles
Chopped-cabbage sandwich
Fruit
Milk

With greater resources, the school cafeteria may not only offer a wider range of foods, but should also serve as a training ground in the selection of one's own meals. The luncheon should furnish from one-fourth to one-third of the total calories for the day, and at least as high a proportion of all the other dietary essentials. The children are helped in their selection when the menu offers a special "plate" combination which combines high nutritive value with low cost. Such combinations need to be so arranged as to insure the consumption of some milk by every child. It may be in the main dish, e.g., creamed eggs and fish on toast, in a soup or chowder, in the dessert, in all sorts of custards and puddings. The selling of candy in lunch rooms is recognized by cafeteria directors as generally undesirable. The children's money needs to go to meeting their real nutritional needs, instead of diluting their minerals and vitamins, and spoiling their appetites for the foods that meet their "hidden hunger."[1]

If the noon meal is served at home, it may be somewhat more elaborate, provided the child has time to eat it in a leisurely fashion. When he has to hurry back to school this fact must be taken into account, and no extra tax put on his digestive powers. The food plan following will show the general type of food to be chosen.

If a warm, substantial dinner is served at noon, the evening meal may be comparatively simple, especially through the tenth year, as also indicated in the food plan below. Children of eleven and twelve will relish a night meal about as substantial as the noon meal, though they will be perfectly nourished with the sim-

[1] For an ample discussion of the luncheon menu consult *The School Cafeteria*, Bryan, M. DeG., F. A. Crofts Co. (1926). This has excellent bibliographies on the whole subject of school feeding.

A Day's Food Plan for a Child Eight to Ten Years Old

Fuel Requirement: 1700–2000 Calories   Cost: 1¾–2½¢ per 100 Calories

Breakfast:		
7–7:30 A.M.	Orange, banana or other fruit	50–100 Calories
	Well-cooked whole grain cereal	75–100 Calories
	Dry toast or stale bread	50–100 Calories
	Butter	50–75 Calories
	Milk, plain or flavored with cocoa	100–150 Calories
Dinner:		
12–12:30 P.M.	Egg or small portion of fish, lean meat or liver	50–75 Calories
	Potatoes or Sweet potatoes or Baked banana	75–100 Calories
	Green or yellow vegetable simply cooked	25–50 Calories
	Milk (may be combined with vegetable in soup)	100–150 Calories
	Bread	75–100 Calories
	Butter or jelly	50–100 Calories
	A little shredded raw cabbage or other crisp salad vegetable with seasoned fruit juice for dressing or salt	Calories negligible
	Bread, rice or other cereal pudding or Stewed fruit, with cookies	150–200 Calories
Supper:		
5:30–6 P.M.	Cream soup or Macaroni and cheese or Scalloped vegetable	200–300 Calories
	Bread	50–100 Calories
	Butter	25–50 Calories
	Milk	75–150 Calories
	Custard or Cereal pudding or Stewed fruit	100–200 Calories

A Day's Dietary for a Child Eight Years Old

Fuel Value: 1783 Calories

Cost: 1¾–2½¢ per 100 Calories

Meal	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
7-7:30 a.m.				
Orange (C, B_1, G)	½ large	4.7	3	50
Oatmeal (B_1)	½ cup	3.6	12	75
Cream, thin (A)	2 tbsp.	0.9	2	50
Milk (A, B_1, G)	⅘ cup	6.8	25	133
Whole wheat toast	¾ slice, 3 in. x 3¾ in. x ½ in.	0.7	8	50
Butter (A)	2 tbsp.	0.3	—	66
				424
Dinner:				
12:30 p.m.				
Egg timbale (A, B_1, G)	½ cup	5.6	32	125
Baked potato (C, B_1)	1 medium	3.0	11	100
Asparagus tips (B_1, A, C, G)	5 stalks	1.9	4	11
Bread	2 slices, 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter (A)	2 tsp.	0.3	—	66
Peanut butter (B_1)	1⅔ tsp	0.4	12	66
Stewed pears (B_1, G)	½ cup	4.0	1	100
Sugar cookies	2 cookies, 2¼ in. diam.	0.9	6	100
Milk (A, B_1, G)	⅘ cup	6.8	25	133
				801
Supper:				
5:30-6 p.m.				
Scalloped potatoes (C, B_1, A, G)	½ cup	2.8	7	80
Stewed tomatoes (C, A, B_1)	½ cup tomatoes ½ tsp. butter	4.5	6	75
Bread sticks	12 sticks	0.4	10	75
Cornstarch blanc mange (A)	½ cup	5.4	18	200
Milk (A, B_1, G)	⅘ cup	6.8	25	133
				558
Total for day			230	1783

A DAY'S DIETARY FOR A CHILD TEN YEARS OLD

Fuel Value: 1983 Calories — Cost: 1¾–2½¢ per 100 Calories

MEAL	MEASURE	WEIGHT Oz.	PROTEIN CALORIES	TOTAL CALORIES
BREAKFAST:				
Orange (C, B_1, G)	1 large	9.5	7	100
Shredded wheat (B_1)	1 biscuit	1.0	13	100
Top milk (10 oz.) (A)	¼ cup	2.1	9	100
Milk (A, B_1, G)	¾ cup	6.4	24	125
Toast	2 slices, 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter (A)	½ tbsp.	0.3	—	50
				575
DINNER:				
Hamburg steak (G)	1 ball	1.3	41	75
Baked sweet potato (A, B_1)	1 potato	4.5	9	150
Bread	2 slices, 3 in. x 3½ in. x ½ in.	1.4	14	100
Butter (A)	1 tbsp.	0.5	—	100
Creamed peas and carrots (A, B_1, C, G)	⅔ cup	5.0	14	75
Shredded lettuce with orange juice (C, B_1, A, G)	2 leaves	0.4	—	—
Bread pudding (with raisins) (B_1)	¾ cup	6.0	18	200
Milk (A, B_1, G)	¾ cup	6.4	24	125
				825
SUPPER:				
Potato soup (A, B_1, C)	¾ cup	6.3	22	150
Saltines	6 crackers	0.8	10	100
Banana and lettuce salad (B_1, A, C)	¼ banana, 1 tbsp. orange juice	1.8	1	33
Whole wheat bread (B_1)	¾ slice, 3 in. x 3¾ in. x ½ in.	0.7	8	50
Butter (A)	½ tbsp.	0.3	—	50
Stewed apples (B_1, C)	⅔ cup	5.0	1	100
Molasses cookies	3 cookies, 2 in. diam.	0.7	6	100
				583
Total for day			234	1983

pler supper. If the noon meal has been a cold or light lunch, then the dinner may be given at night. In any case, the evening meal should be served by six o'clock, so as not to interfere with an early bedtime. A healthy child of eight years may be anywhere from 43 to 51 inches in height and weigh from 39 to 75 pounds, and in later years even more individual variation is possible.[1] The energy requirement will vary, not only with the body weight, but with the degree of physical activity, and boys with their higher muscular tension and tendency to vigorous sport will usually demand somewhat more food than girls of corresponding size; hence an absolute standard cannot be set. The following figures, however, deduced from the observations of many persons on the food needs of school children, will serve as a general guide as to suitable amounts of food to meet energy and protein requirements and the food plan and dietaries on pages 227, 228 and 229 show the kind of selection which will guarantee adequate minerals and vitamins.

Age in Years	Protein Calories per Pound	Total Calories per Pound
8–9 10–12	3–4	32–35 30–34

[1] See Appendix, Tables VI and VII.

Chapter XII

FOOD IN ADOLESCENCE AND YOUTH

During adolescence development is again in some respects very rapid; boys grow suddenly tall and have the task of covering their long body frames with muscle; girls grow less fast, usually, but must meet demands for more blood, and take on the supply of muscle and fat which gives them the contours of womanhood. Inadequate and unsuitable food at this time hinders normal development just as truly as in infancy, and many a healthy child fails to make the strong man or woman of which he gave promise because of malnutrition in these critical times. Careful training from birth will, of course, help a great deal in tiding over the adolescent years, but in the storm and stress of the period certain vagaries of appetite may develop, such as the desire on the part of girls to avoid all plain food and live on sweets or other highly flavored food; the insistent craving for food on the part of boys, that leads to the consumption of unduly large quantities at one time,—so that wise guidance in regard to food is still essential. In addition to keeping out of the menu dishes which are decidedly difficult of digestion, or limiting them to occasional use under the most favorable circumstances for taking care of them, there should be such supervision of the food eaten that drifting into the habit of a very one-sided or insufficient diet is impossible.

The drinking of milk should be encouraged, and tea and coffee absolutely forbidden. Cocoa or cereal coffee in which milk and hot water is the foundation fluid provide an acceptable warm drink for breakfast or supper. Cereals for breakfast are perhaps accepted more unquestioningly by boys with their keener appetites than by girls, but with the wide range of choice now possible, an acceptable one should be found, or for girls there may be sub-

stituted toast made from whole wheat bread, served with hot milk or cream or a sliced banana with cream or orange juice.

A daily portion of orange or other fruit juice rich in vitamin C should be continued. Fruit, fortunately, is usually well liked, and while this may be an expensive item in the diet, it is too important a source of body building and regulating material to be neglected. People who will buy porterhouse steak and lamb chops for themselves should not begrudge money for fresh fruit in the diet of their children. Those who must economize closely will have to depend more upon dried and less upon fresh fruit, except as the latter can be obtained cheaply in the height of the season. In the country, of course, fruit may be canned and so saved for use when out of season. Green vegetables should be used as freely as possible, especially in the dietary of growing girls who need an especially rich supply of iron and vitamin A in proportion to their total calories. Salads are usually popular if daintily prepared, and become a very useful part of the high school girl's menu. They should consist of crisp raw or cooked vegetables, fresh fruit, eggs, or fish served with a simple cream or oil dressing without high seasoning. Strong condiments have no place in the dietary of youth, and rich salads of meat or fish with a heavy load of mayonnaise dressing are a tax even on the sturdy adult stomach. Although cooked vegetables seem more substantial to voracious boys, they should be taught the value of lettuce, celery, raw carrots, and the like, as sources of minerals and vitamins.

Meat should be provided in moderate amounts, two to four ounces a day. It is generally liked, and if wisely used, adds to the palatability of an otherwise adequate diet. As an addition to the protein content of the diet, cheese may be used in such dishes as cheese fondue, macaroni or hominy baked with cheese, combinations of rice, cheese, and tomatoes, or as a filling for sandwiches. These are good meat substitutes, and much less expensive than meat.

A variety of breadstuffs will increase the attractiveness of the menu and help to keep up the fuel value of the diet without great expense. The use of different kinds of flour; the incorporation into the loaf not only of the raisins and dates already mentioned,

but now of nuts, especially walnuts or filberts; the sprinkling of cinnamon and sugar over the top of the loaf,—are some of the ways of varying this staple food. Warm breads of all kinds should be used sparingly, if at all. When provided, they should be so baked as to have plenty of crust and little soft center, and served for breakfast or luncheon rather than the evening meal. Rolls made from raised dough should be baked with a crisp crust and served cold or reheated on the second day. Small whole wheat or cornmeal muffins, or cornbread or muffin batter baked in a thin sheet, are permissible occasionally, and so is Boston brown bread if served cold. Griddlecakes, waffles, and baking powder biscuit should not appear in the dietary of the child under fourteen and very seldom after that. The habit of eating syrups on hot breads should not be fostered. The temptation to use them to excess is difficult to control, and the appetite for more wholesome food is vitiated. In no case should a hot soft bread constitute the main dish at a meal. On those rare occasions when waffles or griddlecakes are provided, they should follow a cereal or some other plain substantial dish. This insures a smaller consumption of the less digestible food and protects the body by that much.

Bread and cereal puddings, custards, blanc manges, milk sherberts and ice creams are still the most desirable forms of dessert, since they combine high food value with ease of digestion. They are particularly useful in the dietary of boys whose demand for food is so great as to tax their stomach capacity severely. It is possible to overstrain the stomach muscles by too great distention and thus lay the foundation for gastric trouble when the nervous strains of middle life begin to be felt. For hearty boys a fairly concentrated diet is therefore desirable, and large volumes of fluid should not be permitted with meals. Desserts like baked Indian meal or poor man's pudding, where milk is concentrated with the cereal in baking, are ideal for growing boys. Pastry should be used very sparingly. Custard or prune pie or the fruit chiffon pies, having but one crust and conveying valuable milk, eggs, and fruit, with the minimum of pie crust, are examples of the best kinds of pie. Cake if provided should be served as a dessert and should never be rich. Cookies and sponge

or plain cup cake are the best types. These can be varied by chocolate, nuts, or raisins very easily. A glass of milk is an excellent accompaniment of cake for dessert.

Regularity of meals becomes increasingly difficult to secure, but needs to be emphasized as much as ever. Three regular meals a day should be sufficient, but for the rapidly growing youth of keen appetite it is often wise to provide access to some very plain food, such as bread, crackers, or milk, between meals. Girls, especially of high school age, frequently wish to omit breakfast, but they should not be permitted to go to school without any food. A glass of milk or orange juice and a banana will usually make a sufficient appeal and will have many nutritional advantages. "Nerves" are often the direct result of undernutrition, and in this period the welfare of the woman's nervous system is largely determined. Many high school children do not go home for the noon meal, and provision needs to be made for a school luncheon.

The modern school cafeteria has been evolved in response to this need, and is to be regarded, as Dr. Mary de Garmo Bryan says, "as an indispensable feature of the health and teaching programs for all school children." Management should be in the hands of adequately trained dietitians, whose knowledge of the needs of the boys and girls will ensure them nourishing, palatable food at the lowest possible price in an atmosphere of sociability and good order. It is practically impossible to feed any growing child properly without three suitable meals every day, and to attain this end, choice of food in the lunchroom must be wisely directed. Important foods, such as milk and vegetables are sold at a minimum price and less desirables, such as cake, at a relatively higher cost. Offering bargains in food has proven the most practical way to induce high school students to buy the kind of meals they need. The daily menu may include such dishes as the following:

1. Soup, as tomato, green pea, split pea, white and black bean.
2. Two or three hot dishes, as spaghetti with tomato sauce, mashed potatoes with green peas, baked beans, corn pudding, a stew with vegetables or a hot roast beef sandwich.
3. Salads, as potato, egg, fruit, green vegetable or tomato.

4. Sandwiches, one or two varieties each day, some whole wheat bread. Lettuce or other raw vegetable frequently included.
5. Fruit, as apples, bananas, stewed fruits of various kinds.
6. Milk and cocoa.
7. Plain cake or sweet wafers offered only in combination with milk or other plain food.
8. Ice cream, charlotte russe, simple puddings, cookies.[1]

The evening meal needs to be more substantial than for the younger children. In the city this will be the time for the regular dinner; in the country it is more likely to be supper. Here we must guard against extremes—too heavy a meal on the one hand and too light on the other. Supper should include one substantial warm dish as a rule. This may be a thick soup, as suggested for the younger children, macaroni and cheese, a stew or chowder, scalloped potatoes or other vegetable, or a loaf of beans or lentils with a cream or tomato sauce. This with plenty of bread and butter, some stewed fruit and cookies, or a wholesome pudding, and milk to drink will make a sufficiently nourishing repast. Suggestions for dinner are given in the food plan on page 237.

The energy requirements of this period are approximately:

Age in Years		Protein Calories per Pound	Total Calories per Pound
10–13	Girls	3	32–27
	Boys	3	34–30
14–17	Girls	3	27–18
	Boys	3	30–23

This means that the total daily requirement for girls from fourteen to seventeen will be from 2200 to 2800 calories; for boys of the same age from 2600 to 4000 calories. Very often by this time the full height will have been attained and the parents are surprised at the large consumption of food, thinking that growth has ceased. But growth is not merely a question of height. As already said, it involves laying on of muscle and fat, development of internal organs and a vigorous nervous system, and these demand food. Furthermore, muscular activity, especially out of doors, is

[1] For full discussion of the school lunch consult *The School Cafeteria*, Bryan, M. de G., F. S. Crofts and Co. (1936).

a great aid in muscle and nerve development, and the extra fuel required to support this activity should never be begrudged young people of either sex. For five or ten years after full height is reached their food consumption will be considerably higher than that of adults of the same size. As long as they confine themselves to simple nourishing foods at regular hours they are not likely to overeat. Sometimes their expenditures in growth and activity exceed their assimilative powers. Especially is this true of those who grow very tall with great rapidity and indulge freely in active sports and dancing. To leave a balance in favor of the body it may be for a time necessary to curtail the activity somewhat—to insist on longer hours for rest and less violent exercise until substantial gains in weight and other signs of physical welfare show that the energy demands are not greater than the energy supply.

For the best development, the mineral and vitamin supplies must continue to be liberal. This is a simpler problem for boys whose energy intake is high. A quart of milk, 200 calories of whole grain breakfast food, 400 calories of whole wheat bread, 100 calories of orange juice, 200 calories of other fruit, at least 25 calories of a green vegetable, and 300 calories of potatoes will provide adequate minerals and vitamins for a boy needing 3000 to 3500 total calories.

Girls desiring to keep from gaining too much weight need a diet relatively richer in protein, minerals and vitamins in proportion to total calories. As the calories go down, the protective foods must go up. There is little room for sugar, decorticated cereals, white bread or cake. A quart of milk is still the best basis of the diet. A liberal portion of orange juice once a day and other fruits twice a day, servings of two cooked green or yellow vegetables at each of two meals, and fruit or vegetable salad at each of two meals, will with the milk insure adequate minerals and vitamins C and G. If whole grain cereals and bread are restricted in order to cut down calories, some excellent source of vitamin B_1 such as wheat germ or yeast tablets should be provided daily. For vitamins A and D a halibut liver oil capsule daily is an important safeguard. It is exceedingly important that the mineral and vi-

The newer knowledge of nutrition offers life on a plane of buoyant health.

tamin supplies be kept fully as high for the girl who wishes to restrict her weight gains somewhat as for the girl on a liberal calorie intake. This means that the proportion of these essentials to total calories should be practically doubled.

The food plans and dietaries which follow are for normal active boys and girls. The latter should be encouraged to spend enough calories in activity to maintain normal weight without drastic food restriction.

A Day's Food Plan for a Boy Fourteen to Sixteen Years of Age

Fuel Requirement: 3000–4000 Calories — Cost: 1¾–2¼¢ per 100 Calories

Breakfast:	Fruit	50–100 Calories
	Cereal	200–250 Calories
	Milk	300–350 Calories
	Bread	150–300 Calories
	Butter or butter substitute with vitamin A	200–300 Calories
		900–1200 Calories
Luncheon:	Macaroni and cheese or Hot roast beef sandwich or Bean soup and crackers	200–300 Calories
	Cocoa or milk	150–250 Calories
	Whole wheat bread	200–300 Calories
	Butter	200–300 Calories
	Baked custard or Rice pudding or Baked apple	250–300 Calories
		1000–1300 Calories
Dinner:	Meat or Bean loaf or Scalloped eggs with ham	150–300 Calories
	Potatoes or Macaroni or Sweet potatoes	100–200 Calories
	Green vegetable, cooked	50–150 Calories
	Fresh fruit or vegetable salad	100–200 Calories
	Bread	150–300 Calories
	Butter	100–300 Calories
	Ice cream or Tapioca cream or Chocolate blanc mange	250–300 Calories
	Milk or cereal café au lait	150–250 Calories
		1100–1500 Calories

A Day's Dietary for a Boy Aged Sixteen Years

Fuel Value: 3640 Calories Cost: 1¾–2¼¢ per 100 Calories

	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Banana (B_1, C, A)	1 large	5.5	5	100
Oatmeal (B_1)	1½ cups	9.6	34	200
Milk (A, B_1, G)	1½ cups	12.7	48	250
Cornmeal muffins (A)	2 small muffins	3.2	36	275
Butter (A)	1 tbsp.	0.5	—	100
Sugar	1 tbsp. (scant)	0.5	—	50
				975
Luncheon:				
Macaroni and cheese (A)	1 cup	4.2	34	200
Whole wheat bread (B_1)	3 slices, 3 in. x 3¾ in. x ¼ in.	1.4	16	100
Butter (A)	1 tbsp.	0.5	—	100
Cocoa II[1] (A, B_1, G)	⅘ cup	7.6	32	200
Stewed rhubarb (C)	¾ cup	5.9	1	150
Gingerbread I[1]	2 small pieces	2.2	14	200
				950
Afternoon Lunch:				
Whole wheat bread (B_1)	3 slices, 3 in. x 3¾ in. x ¼ in.	1.4	16	100
Butter (A)	1 tbsp.	0.5	—	100
				200
Dinner:				
Swiss steak (G)	2 slices, 4 in. x 1 in. x ⅝ in.	2.2	70	200
Mashed potatoes (C, B_1)	⅞ cup	6.2	14	200
Stewed tomatoes (C, B_1, A, G)	¾ cup	6.7	9	120
Cole slaw (C, B_1, A)	¾ cup	2.1	5	75
Bread	4 slices, 3 in. x 3½ in. x ½ in.	2.7	28	200
Butter (A)	2 tbsp.	1.0	—	200
Brown Betty	⅗ cup	6.1	11	300
Milk (A, B_1, G)	1 cup	8.4	34	170
Sugar	1 tbsp.	0.5	—	50
				1515
Total for day			407	3640

[1] See Table II, Appendix.

A Day's Food Plan for a Girl Fourteen to Sixteen Years of Age

Fuel Requirement: 2200–2800 Calories   Cost: 2–2½¢ per 100 Calories

Breakfast:	Fruit (fresh if possible) or fruit juice	50–100 Calories
	Cereal or fruit as substitute (banana, prunes or figs)	75–150 Calories
	Top milk for cereal or fruit	100–200 Calories
	Toast	50–100 Calories
	Butter	75–100 Calories
	Sugar	50–100 Calories
	Milk for cereal coffee	50–100 Calories
	Cereal coffee	— — —
		500–700 Calories
Luncheon:	Vegetable soup and crackers or 2 cooked vegetables or Meat and vegetable plate or Fruit salad	200–300 Calories
	Sandwich or Nut or raisin bread and butter	150–250 Calories
	Ice cream or Fruit gelatin jelly with whipped cream or Baked apple and cream	150–250 Calories
	Cocoa or milk	150–200 Calories
		800–1000 Calories
Dinner:	Rice and meat timbale, tomato sauce or Potatoes scalloped with ham or Broiled Hamburg steak	150–200 Calories
	Potatoes or any other vegetable or baked banana	100–150 Calories
	Another cooked vegetable, preferably green (Swiss chard, Brussels sprouts, peppers, broccoli, new cabbage)	50–75 Calories
	Stewed fruit or Fruit salad or Raw crisp vegetable	25–100 Calories
	Whole wheat bread	50–100 Calories
	Butter	75–100 Calories
	Chiffon pie or Spanish cream or Rice dainty	150–200 Calories
	Cereal café au lait	100–150 Calories
	Sugar	50–75 Calories
		900–1100 Calories

A Day's Dietary for a Girl Aged Sixteen Years

Fuel Value: 2319 Calories — Cost: 2–2½¢ per 100 Calories

	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Orange (C, B_1, G)	1 medium	7.6	6	80
Oatmeal (B_1)	¾ cup	4.8	17	100
Top milk (12 oz.) (A)	⅜ cup	3.0	10	100
Whole milk (A, B_1, G)	⅝ cup	5.1	19	100
Toast	2 slices, 3 in. x 3½ in. x ½ in	1.4	14	100
Butter (A)	1 tbsp.	0.5	1	100
Sugar	1 tbsp. (scant)	0.5	—	50
Cereal coffee	1 cup	—	—	—
				630
Luncheon:				
Corn chowder (B_1)	⅘ cup	6.6	24	200
Date and cheese sandwich	3 triangles, 3 in. x 3½ in. x 4⅗ in.	3.0	27	290
Cocoa I[1] with whipped cream (A)	¾ cup	7.0	16	155
Baked apple (B_1, C)	1 small	3.2	1	140
				785
Dinner:				
Broiled Hamburg steak (G)	1 large cake	3.0	82	150
Brown sauce	3 tbsp.	1.7	7	50
Baked potatoes (C, B_1)	1 medium	3.0	11	100
Stuffed peppers I[1] (C)	1 small	2.6	9	50
Banana salad (A, B_1, C, G)	1 serving	3.0	13	110
Butter (A)	1 tbsp.	0.5	—	100
Orange chiffon pie (A, C, G)	⅙ of 9 in. pie	3.8	29	289
Cereal coffee (¼ milk)	1 cup	8.0	5	40
Sugar	1 tsp.	0.2	—	15
				904
Total for day			288	2319

[1] See Table II, Appendix.

Food for Boys and Girls from the Seventeenth to the Twenty-fifth Year

By the end of the sixteenth year good habits in eating ought to be well established, and the digestive system should be strong enough to care for all reasonably wholesome food, if offered at suitable times. The energy requirements of the next few years depend very largely upon the nature of the youth's occupation, but mineral and vitamin requirements remain high for all. Up to this time the majority have been held in school by choice or law, but now some engage in vigorous muscular labor, some go into sedentary trades, and some continue to go to school. Nearly all continue to increase in body weight, and many in height, for four or five years, if not longer. The processes initiated, sometimes with such vigor, in the period of adolescence are now more slowly completed. Muscle is added, internal organs perfect their structure, the nervous system grows stronger, and that fine working machine—the adult man or woman—comes upon the scene.

The influence of active and sedentary life upon the choice of food has already been discussed in the chapters dealing with the adult man and woman. The active youth engaged in outdoor labor can thrive on the simple rations of pork and beans, cabbage and potatoes, corn bread, milk, and apple pie, provided they are sufficient in amounts to cover all of his food needs. Outdoor life and fresh air are sauce to his appetite and tonic to his digestion. Sunshine enables him to manufacture his own vitamin D. On the other hand, the young bank clerk, sitting in a hot, close room, with no more exercise than a short walk or two, would find his brain utterly befogged by such a diet because conditions are not favorable for digesting it. He must have the fare of the sedentary man, in quantities carefully meeting his daily needs, and daintily prepared, since his living conditions foster neither keen appetite nor vigorous digestion. Girls at sedentary occupations are more liable to suffer from the blunting effect on appetite than boys, and are tempted to eat foods of high flavor, like pickles and candy and soda fountain sweets, with little regard to after-affects. The food plans already suggested for sixteen-year-old girls and sedentary women indicate the type of diet which

they should try to secure, adjusting the calories according to their individual needs. Interest in eating can be more than pleasing the palate only as they learn what food values mean. No girl or boy should be allowed to finish the high school without the fundamentals of this knowledge.[1]

Young people entering the commercial world are frequently confronted with the luncheon problem. If they take food from home, there must be careful selection, just as in the case of the boy or girl at school, and a warm beverage should be included if possible. More and more are factories and other commercial concerns realizing the relationship between good feeding and efficiency in their employees, and establishing their own lunch rooms, with experts in charge to provide good food at moderate prices and perhaps also a nutritionist to act as a general health adviser. Very often, however, the boy or girl must patronize some public restaurant with no guidance as to what to choose. Those lunch rooms which provide plain, clean food under sanitary conditions, but without expensive frills in the way of table decoration and service, are doing a real service to young men and women of small means forced to lunch away from home. But the individual must still decide for himself what shall constitute his meal. A serving of wheat cakes and maple syrup will give approximately the same fuel value as one of crackers and milk and looks more interesting, no doubt, but the latter is much less liable to cause digestive disturbances and is far richer in building material for the still growing organism. Similarly, a serving of baked macaroni and cheese, with its accompanying bread and butter, as the main part of the luncheon would be preferable to a piece of mince pie, though the cost of calories might be the same.

While the importance of fruit and vegetables is not to be lost sight of, their purchase as a part of a restaurant meal is not always good economy. The cost of an orange in a restaurant is not only the purchase price of the fruit, but a necessary charge for service, for rent and all the other things that go into "overhead" in a business. Now a boy or girl, if living at home, can usually purchase

[1] For suggestions as to how to present it consult *Teaching Nutrition in Biology Classes*, N. E. Bingham, Bureau of Publications, Teachers College, Columbia University (1939).

fruit outside at less cost, and make it a part of the home meal. The same is true of raw vegetables and salads. One gets a better return on one's money in a restaurant on the cooked vegetables. And if one can have these at home, it is better economy to stick to potatoes, beans, macaroni, and the like in the restaurant and make up the deficiency of this meal at home later.

Most young people need from 750 to 1200 calories for luncheon, the exact amount depending, of course, upon many factors—the kind of breakfast, the size and activity of the individual, and so forth. But even when growth has slowed down to these last stages, the welfare of any young person is usually promoted by three regular meals, each fairly substantial. Some examples of simple luncheons in which the cost of the food materials at retail is from 1½ to 2 cents per 100 calories are given below.

Inexpensive Luncheons

I.	Cream of tomato soup	1 cup	225 Calories
	Toast	2 slices	100 Calories
	Butter	1 tbsp.	100 Calories
	Rice pudding	⅘ cup	325 Calories
			750 Calories
II.	Potato soup	¾ cup	200 Calories
	Croutons, toasted	25 cubes	50 Calories
	Cornmeal and raisin pudding	⅔ cup	300 Calories
	Sugar cookies	2 large	200 Calories
			750 Calories
III.	Bean soup	1½ cups	150 Calories
	Corn bread	2 in. × 4 in. × 4 in.	200 Calories
	Butter	1 tbsp.	100 Calories
	Chocolate blanc mange	½ cup	200 Calories
	with cream (thin)	¼ cup	100 Calories
			750 Calories
IV.	Cheese and nut sandwiches	2 large	415 Calories
	Dates	10	200 Calories
	Buttermilk	1½ cups	135 Calories
			750 Calories
V.	Milk	1 cup	170 Calories
	Date sandwiches	2 large	380 Calories
	Sliced orange (1) and banana (1) with		175 Calories
	Sugar	½ tbsp.	25 Calories
			750 Calories

VI.	Grapenuts	7½ tbsp.	250 Calories
	Sugar	2 tbsp.	100 Calories
	Milk	1¾ cups	300 Calories
	Banana	1 large	100 Calories
	Salted peanuts	12 nuts	50 Calories
			800 Calories
VII.	Macaroni and cheese	1 cup	200 Calories
	Lettuce salad, French dressing	small serving	100 Calories
	Whole wheat bread	2 slices	100 Calories
	Butter	1 tbsp.	100 Calories
	Gingerbread	2 in. × 2 in. × 2 in.	200 Calories
	Whipped cream	2 tbsp.	100 Calories
			800 Calories
VIII.	Nut loaf, tomato sauce	½ cup	200 Calories
	Cornmeal muffins	2 small	200 Calories
	Butter	1 tbsp.	100 Calories
	Lemon milk sherbet	¾ cup	300 Calories
			800 Calories
IX.	Creamed dried beef	½ cup	175 Calories
	Baked potato	1 large	150 Calories
	Baking powder biscuit	3 small	125 Calories
	Butter	2 tbsp.	200 Calories
	Sliced banana (1) with sugar (1 tbsp.) and thin cream (3 tsp.)		175 Calories
			825 Calories
X.	Cheese fondue	⅔ cup	200 Calories
	Brown bread	3 slices	150 Calories
	Butter	1 tbsp.	100 Calories
	Cocoa	⅘ cup	200 Calories
	Rice pudding (creamy)	½ cup	200 Calories
	Whipped cream	1 tbsp.	50 Calories
			900 Calories

For the college youth the feeding problem is one of adaptation to a life partly active and partly sedentary, with some allowance of surplus for growth throughout most if not all of the four years. Within the period from the eighteenth to the twenty-third year most young people complete their college education, and this is the time when they should be laying the final stones in that foundation of physical health and strength which is to make their active working years most effective. It is not always realized that these are years for storing capital physically as well as mentally. Too often young people are released from the safe-

guarding routine of home life and left to their own devices as regards food in the college community, when their eating ought to be carefully supervised. The existence of the training table shows some recognition of the fact that unwholesome living and physical fitness are incompatible, and what we need is to extend this idea in a modified form to every student in college—to make every college table a training table for high physical resistance in future years. Many institutions have their own dining halls, where the food can be properly prepared and served; small excuse for these if it is not adequate for the students' needs! And yet, all too often, the selection is left to some one with no real knowledge of the principles of good feeding, whose work is judged by the size of the bills and not at all by the well-being of the young people. With trained dietitians available, this is no longer excusable. On the other hand, college students do not need expensive and elaborate fare; and even the expert college dietitian is likely to suffer many and severe criticisms from the members of her group, because of the different standards of living which they bring with them, the bad eating habits which they may have acquired in their own homes, and the utter separation in their minds of the price which they pay for board from the kind of fare that a given sum of money will buy. At one time Mrs. Richards made an investigation of a college dining hall in the University of Chicago where there were complaints of the food. The students were asked to make out some bills of fare which would please them, and it was found that to give them what they wished would cost about $10 per week, whereas they were paying $3.50! It is only by education and establishing confidence in the dietitian that such problems can be satisfactorily met.

Schools which do not provide dining halls of their own have a responsibility for the kind of eating houses patronized by their students, and should at least be able to warn against those which are unsanitary. Young people of limited means are in danger, if left to themselves, of economizing on food to the detriment of their health, and will naturally pick out those restaurants where they can seemingly get the most food for the least money. This is perfectly legitimate till we come to the type of eating house

which buys adulterated, spoiled, or otherwise inferior food and skimps on dishwashing, refrigerator cleaning, and other necessary sanitary precautions, in order to sell at a low price. From such, the college student needs to be strictly guarded. Fortunately the habit of "boarding oneself," which was fairly common 75 years ago, is not so prevalent today. Instead, we have the cooperative dining hall directed by a trained dietitian, the work being done by the students. By giving two or three hours of labor, they are able to obtain an excellent diet at minimum cost. Less fortunate are the students living in fraternity and sorority houses, who at the present time have little guidance on their dietary program, and depend on "a good reliable cook" or a manager who keeps the food bills within the budget allowance. There are always some students who cannot afford to live in dormitories or sorority houses, and must get part of their food in their rooms. They, too, need guidance, and parents should insist on the colleges to which they entrust their children extending the services of the dietitian to those students now outside the pale of their influence, and also see to it that every student during his college career, receive enough training in the fundamentals of modern nutrition to enable him to avoid the risk of a break-down at the age of thirty-five or forty. It is sad to be unable to stand the strain of existence because of an inadequate diet in these critical years of development. With proper nutrition and rational division of work, rest, and play, the college student should emerge from his four-year course stronger physically as well as mentally. To achieve this is a part of his education.

Specifically, the college youth needs an ample diet of plain food rich in building and regulating materials. During periods of more intense study the food should be specially easy of digestion. Such fare as already outlined for the boy and girl of sixteen should in the main be provided. Milk should be served freely as a beverage, and will often be found to cut down the amount of more expensive food. At any rate, it is food which the young people should be encouraged to take, and may be the means of providing those individuals with high food requirements with a full quota of nourishment when the following of the conventional menu would

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With proper nutrition and rational division of work, rest and play, the college student should emerge from his four-year course stronger physically as well as mentally.

scarcely satisfy them and they would be tempted to get the extra calories in the form of candy or other sweets. Thus a boy of eighteen was given an excellent diet so far as food selection went, but was found to be buying candy after every meal. Study of his diet showed that what he was given at the table was only about half enough to meet his energy needs. If milk had been available, he would willingly have taken that instead of the candy. Fruits and vegetables must be liberally provided and college boys and girls must have a "will to eat them." If they have been carefully trained in eating from their early years this will be comparatively easy, but there will be some who need constant encouragement to develop rational eating habits.

It is well to bear in mind, too, that nothing interferes with clear thinking more than constipation, and the sedentary student on a diet chiefly composed of meat and potatoes, eggs, milk, and white bread is particularly liable to this malady. Those who have young people to care for should insist on a food allowance liberal enough to include plenty of fruit and vegetables, and should encourage also the use of whole wheat bread and cereals from whole grains to provide ample vitamin B_1.

Advantage may be taken of holidays and other times when physical and outdoor activity is increased to vary the menu by the introduction of some foods which are too slow of digestion for the person at brain work. If afternoons are given over to athletics and little study is done early in the evening, baked beans and brown bread will make an acceptable supper. On a cold Saturday, after hours out of doors, mince pie or suet pudding will be a satisfying dessert. But no student should be set to his evening task on a meal of hot biscuits and honey. To satisfy his youthful needs for energy he will have to eat more of them than will be good for his digestion, and minerals and vitamins will be conspicuously lacking. A thick soup, or other substantial hot dish, and a cereal pudding with fruit, along with plenty of milk and whole wheat bread and butter, will fufill his requirements much better.

The food of growing children and youth is relatively more expensive than that for adults, because of their higher expendi-

ture of energy in proportion to size and the greater need for building materials and vitamins, which are more costly than "calories only." While we insist on economy in the use of food materials, it must be a wise economy, avoiding waste but recognizing the necessity of an adequate food supply through all the college years. If rigid economy must be practiced, let it be as far as possible on the seasoned adult who can best bear it, and not upon the developing young people whose right it is not only to be well born, but also well reared.

Twenty-five years serve to round out the period of growth. Then follows a span of a quarter of a century or more which constitutes the period of adult life, whose food needs have been discussed in Chapters V and VI. After fifty one must consider certain modifications for advancing age, which are treated in the next chapter.

Chapter XIII

FOOD AFTER FIFTY

When the Crystal Palace Exposition was opened in London in 1853, the expectation of life among white children at birth was slightly under 40 years. But at the time of the Fairs in New York and San Francisco in 1939, 86 years later, it had increased to 61.5 years. At the age of 50 the average citizen may still look forward to nearly a quarter of a century of life. Much of this great advance has been due to the discovery of the bacteria and the conquest of bacterial diseases. Safeguarding of water and milk, preservation of food by canning and cold storage, protection against unwholesome food products through better food and drug laws and a general rise in the standard of living have all contributed to the prospect not only of longer but also better life. Within the last decade outstanding developments in the science of nutrition have served to emphasize the importance of a good diet at every stage of existence and to promise the further improvement of human life.

Studies on large numbers of animals through many generations have shown that a diet which is adequate for the growth of the young and the reproduction of the species can be improved by more liberal use of dietary factors whose existence was not even dreamed of in 1853. Those which have already been studied systematically into old age in case of a large number of individuals are vitamins A and G and calcium. It has been found that adding more of any one of these dietary essentials to a ration already sufficient for normal growth not only gives the young a better chance as shown by a more rapid rate of growth and larger size at maturity, but also has significance for those past middle life. The enriched diet gives the person full use of his powers sooner and prolongs the prime of life into the period which we have often re-

ferred to as "the declining years." As Dr. Sherman says after study of hundreds of cases, "The same degree of incipient senility which is reached by normal individuals on the 'adequate' diet at an age corresponding to about 65 years in the human life is deferred to an age corresponding to 75-80 years on the nutritionally improved diet'."[1]

A concrete example of a people living on a diet rich in protective factors is cited by Dr. McCarrison, formerly director of the Nutrition Research Laboratory at Coonoor, India. He found the Hansa, a tribe living high up in the Himalayas on a diet consisting largely of goat's milk, eggs, whole grains and fruits, including liberal amounts of apricots, to be so vigorous and so free from diseases of nutritional origin that they lived to an age not attained by the people in other areas of India, subsisting largely on cereals and legumes and even in childhood, manifesting signs of nutritional deficiency. Dr. McCarrison says: "Their longevity and fertility were matters of such concern to the ruling chief that he took me to task for what he considered to be my ridiculous eagerness to prolong the lives of the ancients of his people."

In the United States many persons can still be found who are passing their whole lives on a low nutritional plane. They are not sick, they go about their work and carry on the ordinary functions of human beings, but they never feel as well as they might. They never realize what it is to live "abundantly." To do this there must be a regular health program—physical examinations from time to time (every birthday), correction of any physical defects which may develop, suitable amounts of rest and recreation, and a diet which is known to be definitely contributing to health and not merely keeping the person alive.

Though a man may not be "old" at fifty—may still be vigorous in mind and body—it is likely that his muscular activity has decreased from what it was at thirty. He is more content to watch a ball game than eager to participate in it; he takes his game of tennis (if played at all) more as a duty than as a means of working off surplus animal spirits; he walks where formerly he

[1] Sherman, H. C., *Nutritional Improvement in Health and Longevity*, Carnegie Institution of Washington, Supplementary Publication No. 25 (1936).

"More buoyant health, and an earlier and longer prime of life, results from taking a larger proportion of the needed calories in the form of protective foods."—Sherman, *Food and Health*

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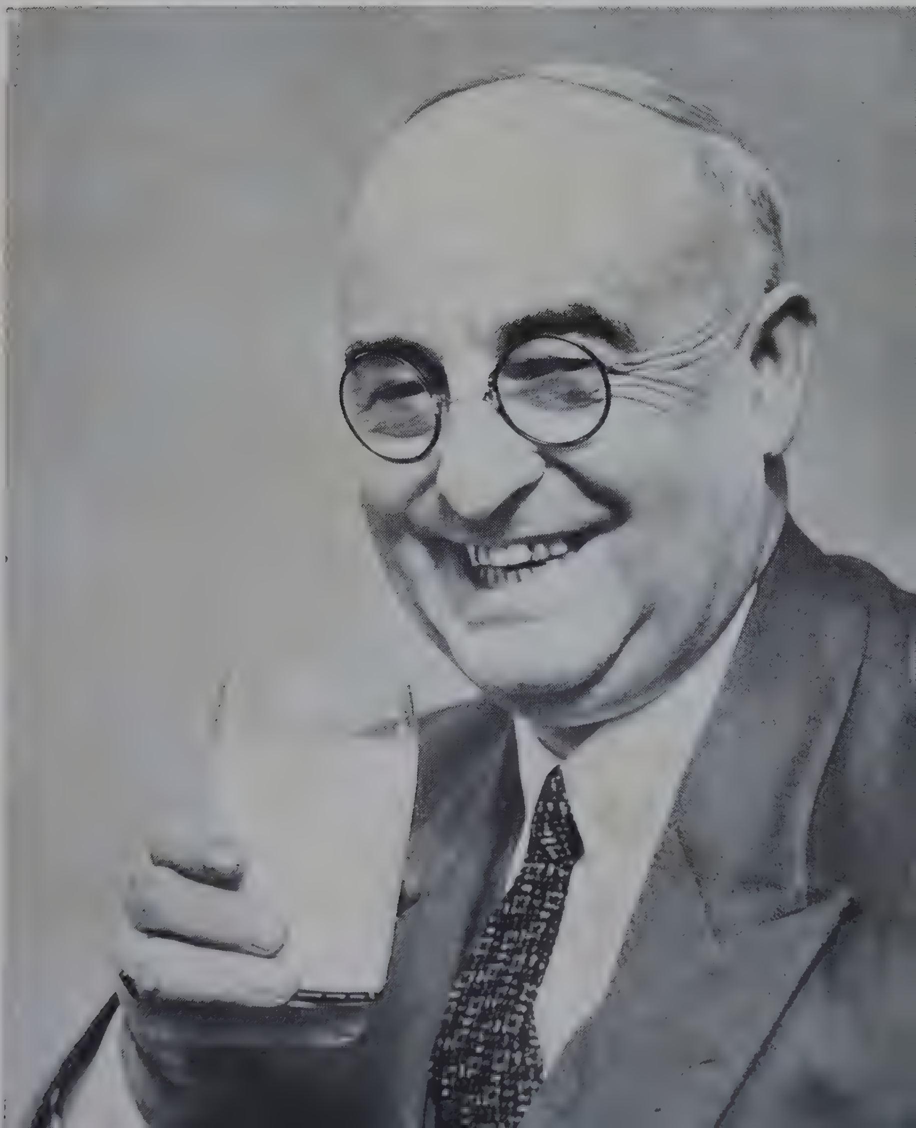

might have run and too often rides when he might walk. This tendency to lessened muscular activity is accompanied by a gradual slowing up of the internal processes demanding fuel for their maintenance and so, with advancing years, the need for calories to support the internal work diminishes somewhat. Appetite, however, may be as keen as ever; the eating habits acquired in more active years are unconsciously followed; or the increase of wealth results in the setting of a more luxurious table, and the palate leads far from the path of necessity—often into danger. The tendency to increase in weight is a sure indication that the fuel intake is greater than the energy expenditure. Watching the scales and observing whether one is growing more than 10 to 15 per cent heavier than the normal weight for his height at age thirty[1] is the best way to discover whether or not one's calorie intake should be cut down.

If the diet up to this time has emphasized the protective foods, milk, fruit and vegetables, with some additional source of vitamin B_1 and of vitamin D when exposure to direct sunshine is not feasible and if it has included few rich foods, condiments or stimulants, no radical change in its general character is necessary. All that needs to be done is to reduce the calories to an appropriate amount. But this must be done without reducing the total amount of minerals and vitamins. Foods like sugar yielding "calories only" should be cut off first. Next come bread and pastries, whose contributions to the diet are chiefly calories. Reduction at these points and care to take only small servings of breakfast cereals or high-calorie desserts or salads with much fat in the dressing may be sufficient for a while. But sooner or later, butter and cream will probably have to be curtailed, and the vitamin A thus lost from the diet must be replaced. This can be done by liberal daily portions of green leafy vegetables (so conveniently low in calories), with a daily portion of egg; or one may choose halibut oil, one capsule of which will furnish only two calories but 7500 or more international units of vitamin A. Each year as one grows older, a larger proportion of low-calorie vegetables, plainly cooked, should be included. Fruit juices without added sugar or tomato

[1] See Appendix, Tables IV and V.

juice will serve regularly as low-calorie sources of vitamin C. Dried brewer's yeast or wheat germ or bran will furnish sufficient vitamin B_1 without adding more than 50 calories a day.

It is roughly estimated that the decrease in food requirement due to old age from the total fuel which would be required by a man of thirty of the same activity is about 10 per cent between the ages of sixty and seventy; about 20 per cent between seventy and ninety; and about 25 per cent after that. In other words, a man who at thirty requires per day 2000 calories simply sitting at rest will require under the same circumstances only about 1800 at seventy and only 1600 at ninety. The ordinary activities of a man of thirty may raise his energy output to 3500 calories per day, but few men of eighty could do sufficient muscular work to transform so much additional fuel. Their lives are likely to be decidedly sedentary; hence 1800 to 2400 calories will probably closely approximate their total daily expenditure, though no absolute rule can be laid down. In general, there is safety in abstemiousness, so far as total calories are concerned but the diet should become relatively richer in minerals and vitamins as the calories are reduced.

It takes twice as much vitamin C to protect the teeth of a guinea pig from signs of deficiency as it does to prevent outward symptoms of scurvy, and it is believed that for the best health a man should have at least three times as much as would give him protection from scorbutic symptoms. A partial deficiency may result in anemia and feelings of lassitude and weakness without any clue as to the cause unless the vitamin C content of the diet is determined or a test is made on the person to see whether his body is as well stocked with the vitamin as it should be.

In studies of the white rat which is, as Dr. Sherman says, "a good deputy" for the human subject, it has been found that in case of vitamins A and G, at least four times as much can be profitably used as is absolutely needed to prevent signs of acute deficiency; and it has been shown repeatedly in human subjects that a diet deficient in vitamin A makes the individual more liable to various types of infection which, though not severe and often unrealized, pave the way for disease if they occur repeatedly. The more spectacular effect of vitamin G is its ability to alter the whole

health status. A young white rat, in age not more than the equivalent of 30 human years, exhibiting all the outward signs of senility after deprivation of the vitamin for several months—wizened, stiff and sore, with poor appetite and little interest in life—is given liberal amounts of the vitamin; in a few days it becomes supple, its rough coat softens, its appetite is regained and its general liveliness bears witness to a now "buoyant" state of health.

Since older people are less likely to be exposed to sunlight than younger adults who are generally more active, the regular inclusion in the diet of some source of vitamin D seems wise. If a halibut liver oil capsule is taken for its vitamin A, some vitamin D will be obtained at the same time. The use of vitamin D milk seems another desirable way for elderly people to get this vitamin. At the same time they receive the calcium and phosphorus necessary to prevent the depletion of these minerals in their bones. Vitamin D is not a substitute for calcium. It has been found in the case of white rats that about three times as much calcium as needed for normal growth can be advantageously used to increase health and vigor.

Any temptation to exist on "tea and toast" should be consistently resisted. Some good source of vitamin B_1 is essential to maintain the best appetite and digestion and the health of the nervous system, all of which tend to suffer in old age, perhaps largely because this vitamin has been so much neglected. The amount which gives the best results differs with individuals, but it can be determined quite easily by watching the results and increasing the amount until the best effect is obtained. Usually not more than from 300 to 500 international units per day will be needed.

One of the practical difficulties in old age is poor mastication. The teeth are lost, the jaws shrink and artificial teeth do not serve adequately to masticate highly resistant foods. It is therefore necessary to provide food which requires little chewing. Instead of the steaks and roasts which furnish much of the protein in middle life, we must substitute milk and soft-cooked eggs; finely scraped or minced meats, or easily flaked fish. Vegetables, if difficult to chew, are likely to be refused. They must be cooked soft or put through a sieve and served as purée or soup. Sweet potatoes

are a valuable source of vitamins A, B_1 and C. If breadstuffs are not well masticated fermentation is likely to result. The substitution of thoroughly crisp toast or zwieback, softened in milk, tea, coffee, soup and the like, usually gives good results, the change in texture making the food break up readily into small pieces so that it will digest more rapidly. Very thoroughly cooked cereals and mashed potatoes are often more useful sources of carbohydrate food than bread since they require no mastication. Many old people are fond of sweets and can eat considerable amounts of simple desserts or other rather sweet food without indigestion.

On account of the slowing of digestive processes and the tendency for the digestive juices to flow less readily, fats should be used rather sparingly. Rich sauces, cakes and puddings, pastries, and fried foods should be discarded. Cream, bacon, butter and olive oil, all forms of fat which can be very simply used, are much to be preferred. Stimulants to gastric secretion may very properly be employed to aid digestion in the aged. Warm food is desirable for the same reason. Instead, then, of a glass of cold water before a meal to start the gastric juice, a warm beverage such as tea or coffee or a clear soup of some kind will be more acceptable. With the lowering of metabolism characteristic of the aged, coupled with sedentary living, there is more difficulty in keeping the body comfortably warm, and more care must be taken to conserve the heat naturally generated. This is another reason for giving warm rather than cold food. Even between meals a hot drink of broth, tea, or coffee will often prove most acceptable instead of plain water, and will counteract the tendency to drink too little which interferes with free elimination of waste products.

With constructive processes at a standstill, or destructive actually in ascendance, the need for protein appears to be reduced to a comparatively low level. As long as life persists there is necessarily some exchange of nitrogenous materials in the processes of cell activity, but the total amount required is less than ever before. There is usually more danger in old age of difficulty in getting rid of a surplus, so that a very moderate supply is best. An allowance in the day's diet of one and one-half protein calories

per pound of body weight should fully protect the body against nitrogen deficiency. Milk is one of the best staples for protein in diets for the aged. Eggs are preferable to meats when mastication is difficult.

Fruit and tomato juices are appetizing and of great value for vitamin C. Stewed or soft raw fruits add pleasing variety to the diet and help in preventing constipation. The banana, if thoroughly ripened, is most acceptable to elderly people and being available all the year round, can be served frequently even in low-cost diets.

Many old people sleep better with some form of nourishment late in the evening or when they waken in the night. Hot milk, plain or modified with a cereal gruel, hot malted milk, or hot bouillon, preferably made with yeast extract, with one or two crackers may be given at such a time. If the person wakes early in the morning, food is often desired before the regular breakfast. Sometimes a few plain crackers may be left by the bedside, some choice ripe fruit, fruit juice, or a glass of milk.

A Day's Food Plan for an Elderly Person

Age 70–80		Fuel Requirement: 1500–1800 Calories
7:30 A.M.:	Soft, sweet fruit or fruit juice	75–100 Calories
	Cereal with added wheat germ, thin cream and a little sugar	100–200 Calories
	Toast or zwieback with butter	100–200 Calories
	Bacon or soft-cooked eggs	75–150 Calories
	Tea or coffee with cream and sugar	100–200 Calories
12:30 P.M.:	Cream soup	100–150 Calories
	Fish or oysters, cheese soufflé or fondue	100–200 Calories
	A green vegetable, cooked soft	10–25 Calories
	Rice, or baked banana, white or sweet potato	75–100 Calories
	Toast or zwieback with butter	100–200 Calories
	Stewed fruit or fruit jelly with gelatin or tapioca	100–200 Calories
4 P.M.:	Tea or coffee, or tomato bouillon, or malted milk, toast or crackers	75–150 Calories
6 P.M.:	Chicken, or lamb chop, or broiled beef balls	100–150 Calories
	Riced, or baked, or mashed potato	75–100 Calories
	One other cooked vegetable (soft enough to mash with a fork)	25–100 Calories
	Toast or zwieback, or dinner biscuit	75–100 Calories
	Custard, or cereal pudding, or ice cream	100–200 Calories
	Tea or coffee with cream and sugar	100–200 Calories

By such additions to the menu, it is likely to come about that the number of meals is increased in extreme old age to five or six instead of three a day. In many ways the diet gradually approximates that fed to children in the first five or six years—fruit juices, soft fresh or stewed fruits, well-cooked whole grain cereals with added wheat germ or other specially reinforced cereals now on the market, milk, eggs, soft or strained vegetables, and simple puddings making a large part of the ration. Small meals coming at frequent intervals are more acceptable than large amounts of food at one time.

A Day's Food Plan for an Aged Person

Age: 80 or over — Fuel Requirement: 1400–1600 Calories

6 A.M.:	Weak tea or coffee with hot milk or cream or hot milk or malted milk	75–100 Calories
8 A.M.:	Orange or pineapple juice	25–50 Calories
	Soft-cooked egg or omelet or well-cooked cereal with added wheat germ	75–150 Calories
	Zwieback or toast	75–150 Calories
	Weak tea or coffee with hot milk or cream	75–100 Calories
12:30 P.M.:	Cream soup or vegetable purée with croutons	100–200 Calories
	Broiled, baked, or boiled fish, small serving or Cheese soufflé or egg timbale	100–200 Calories
	Baked, riced, or mashed potato	50–100 Calories
	A cooked vegetable, mashed or chopped (as peas, squash, asparagus tips, broccoli)	25–75 Calories
	Stewed or baked fruit[1] or raw banana	100–150 Calories
	Weak tea or coffee with hot milk or cream	75–100 Calories
4 P.M.:	Tea or coffee with hot milk or cream	75–100 Calories
6 P.M.:	Broth or tomato bouillon	10–15 Calories
	Minced chicken, lamb, mutton, or beef, small serving	75–150 Calories
	Zwieback or toast lightly buttered and moistened with hot salted water or vegex bouillon	75–150 Calories
	A cooked vegetable, mashed or chopped	25–100 Calories
	Cereal pudding or custard or ice cream	100–200 Calories
10 P.M.:	Broth	10–15 Calories
	Toast	25–50 Calories

[1] If sugar causes gastric disturbance, saccharine may be used in placed of part or all of it. If the fruit acid is irritating, a very little bicarbonate of soda may be used to neutralize it.

A DAY'S DIETARY FOR AN AGED PERSON, BASED ON THE PRECEDING PLAN

Fuel Value: 1639 Calories

	Measure	Weight Oz.	Protein Calories	Total Calories
6 A.M.				
Buttermilk (G, B_1).........	¾ cup..............	7.4	25	75
8 A.M.				
Pineapple juice (C, B_1)......	⅔ cup..............	5.3	—	100
Dark farina with added wheat germ (B_1, G).............	⅜ cup..............	3.0	6	50
Milk (top 10 oz.) (A, B_1, G).	¼ cup..............	2.7	9	100
Sugar.....................	1 tsp. (scant)........	0.1	—	16
Bread (toasted)............	2 thin slices..........	0.5	7	50
Butter (A)................	½ tbsp..............	0.3	—	50
Bacon.....................	4-5 small pieces.......	0.5	13	100
Coffee with ¼ cup milk and 1 tsp. sugar (A, B_1, G)....	1 cup................	—	9	60
				526
12:30 P.M.				
Vegex bouillon (B_1, G)......	⅗ cup...............	5.0	13	15
Croutons (toasted)..........	1 doz................	0.7	7	50
Minced lamb with gravy (2 tsp. flour) (G)...........	....	2.4 (Roast meat)	43	120
Baked potato (C, B_1).......	1 small..............	2.3	9	75
Asparagus tips, green (C, A).	4 stalks, 5 in. long....	3.0	9	25
Butter (A)................	½ tbsp..............	0.3	—	50
Tapioca cream (A, B_1, G)....	⅖ cup..............	2.8	12	100
				435
4 P.M.				
Tea with 1 tsp. sugar.......	1 cup................	—	—	16
Bread or toast.............	2 thin slices..........	0.5	7	50
				66
6 P.M.				
Omelet (1 egg, 1 tsp. butter) (A, B_1, G).............	....	—	25	100
Rice steamed with green pepper and tomato (C, B_1, A).	½ cup..............	3.5	7	70
Baked squash (1 tsp. butter) (A)....................	⅓ cup..............	3.0	5	50
Pulled bread..............	1 slice..............	0.5	7	50
Orange jelly (C, B_1)........	½ cup..............	4.0	4	40
Whipped cream (A).........	3 tbsp..............	0.9	2	100
Cereal coffee with ¼ cup hot milk and 1 tsp. sugar (A, B_1, G).................	1 cup................	—	9	60
				470
10 P.M.				
Hot malted milk (A, B_1, G)..	2 tbsp. in ⅔ cup water.	0.6	9	67
Total for day..........			237	1639

Chapter XIV

FOOD FOR THE FAMILY GROUP

A SIMPLE, well-balanced menu provided from day to day for a family group of healthy persons with reasonable appetites ought to go a long way toward insuring the continuance of health, and we have in experience abundant evidence that it will do so. As has already been pointed out, hundreds of laboratory experiments continuing through many generations of animals make it very clear that growth to full stature, freedom from susceptibility to infection, postponement of the signs of senility, and maintenance of youthful vigor depend in large measure upon the continuance of a suitable diet throughout the life history of the individual, his parents, and his grandparents. We should not be blinded to the teachings of such experiments by the fact that the human species grows slowly and has a longer life span than common animals. We must continue human studies over long periods before we can begin to see the workings of the laws of nutrition in the human world. Five years in the life of a child is epitomized in two months of the life of a laboratory rat. Hence we can learn 30 times as fast from the rat as from the child.

It is only by patience and foresight that we can attain the highest nutritional state. No housewife will see startling returns from a good dietary program unless her family has been very distinctly below par at the outset. But every housewife may hope to increase year by year the endurance of her children and see them become vigorous men and women if she can enlist their coöperation in a perpetual "health campaign" in which one objective is always an adequate diet.

The suggestions which have been made in the preceding chapters in regard to the special needs of persons of different ages and occupations can be in the main carried out without detailed cal-

culations of quantities consumed or of food values obtained. But since the fundamental basis of nutrition is in the last analysis a quantitative matter, the housewife has a surer grasp on the situation if she can now and then make a study of the amounts of nutritive material which her group is actually consuming. She will in this way find out whether there is a tendency toward over- or under-consumption, or toward a one-sided diet, and can modify her plans accordingly.

It is proposed, therefore, in this chapter, to describe a simple way of planning family dietaries and to give some illustrations of what can be done towards securing nourishing fare with different sums of money.

Planning a Family Dietary

Since energy is quantitatively the largest of the fundamental requirements in nutrition, we should have at the outset some idea of the fuel needs of our family group. Let us take for illustration a family consisting of a professional man, a woman doing all but the heaviest household tasks, a baby one year old, a boy three years old, two girls, six and nine, a boy of eleven, and a grandmother of ninety. From the data in preceding chapters we may estimate the requirements of the group as follows (assuming average body weights):

Fuel Requirements of the Family

Member of Family	Age	Weight Pounds	Protein Calories[1]	Total Calories
Man	40	154	277–415	2770
Woman	37	125	225–338	2250
Baby	1	21	84–126	840
Boy	3	35	140–210	1400
Girl	6	41	139–208	1394
Girl	9	56	184–276	1848
Boy	11	70	225–338	2250
Woman	90	110	150	1500
Total			1424–2061	14,252

[1] Allowing 10 to 15 per cent of total fuel in the form of protein, which will be sufficient to cover all nitrogen requirements, when protein is of good quality.

Thus we find the total fuel requirement of our group is about 14,000 calories. In the typical family, consisting of father, mother, and three children under fifteen, where the man's occupation is sedentary, the energy requirement usually ranges from 8500 to 12,000 calories per day, depending upon the ages of the children. In a family of the same size, where the father is doing manual labor and often the mother also, or where the children are over twelve years old, the requirement will range from 12,000 to 14,000 calories as a rule. The exact fuel intake will fluctuate somewhat from day to day of course, with minor changes in the degree of activity of different members of the family, so all the housewife need aim to do is to keep the fuel supply fairly constant, without trying to make exact calculations. A little care will prevent a feast of calories one day and a famine the next, and keeping track of body weight will tell whether each is getting his proper share.

Essentials in the Family Dietary

As a working basis in building up the family dietary, it is a good plan to make first a list of the food materials which need to be included in the day's rations, no matter what the particular menu. For the group which we are using by way of illustration there should be provided:

Milk for all—if possible one quart apiece for each child and a pint for each adult.

Orange or tomato juice for the children, preferably for all the family.

At least one kind of fruit besides orange or tomato juice for all the family.

A mild green vegetable for the three youngest.

At least two vegetables besides potatoes for all the others.

Eggs for at least the three youngest children and some protein-bearing food (meat or a meat substitute) for the rest.

To this list may be added those staples which are likely to appear in every day's menu, such as bread, butter, and potatoes.

An estimate can quickly be made of the fuel that will probably be supplied by these items of the diet.

Food Material	Calories
Milk (5 quarts for children, 1½ for adults)	4387
Cereal for all	600
Eggs (3 eggs and 1 yolk)	260
Fruit and fruit juice	800
Green vegetable	300
Bread	1500
Butter for bread	1500
Potatoes	600
Two other vegetables	600
Meat or meat substitute (not including eggs)	800

Comparing these figures with the total energy requirement of the family, it will be noted that the milk will furnish over one-fourth (nearly thirty per cent) of the total calories, the fruits and vegetables of all kinds taken together at least half as many (sixteen per cent) and the eggs and meat together about half as many as the last (eight per cent). In other words these items will make up over half the total calories, leaving the rest to be supplied largely by bread, breakfast cereals and other grain products, fats including butter, or a substitute equally rich in vitamin A, and sugar. Such a diet is not likely to be deficient in protein, minerals, or vitamins unless the fruits and vegetables are restricted to kinds notably deficient in some respect (as the exclusive use of dried fruits and vegetables which would be likely to result in deficiency of vitamin C).

Planning the Menu

Keeping in mind the fact that we are going to include the above foods in the day's menu, we may next decide on the dishes which are to be served for some particular day. Usually the dinner will be planned first, as the most formal and substantial meal, and the meat dish taken as the keynote. Suppose, then, we are to have baked fish, as halibut. This gives us a characteristic protein-bearing food but not in a highly flavored form. We may, therefore, have a soup and salad of pronounced flavor, and develop the following menu of simple, wholesome dishes of which most of the family may partake, thus saving the labor of preparing special dishes for the very young and the very old.

Dinner

Consommé
Baked halibut, egg sauce
Potatoes on the half shell
String beans, buttered
Bread and butter
Tomato salad, French dressing
Apple snow with boiled custard
Lady fingers

This will serve for the father, the mother, and the two older children as it stands, and for the grandmother with the omission of the lettuce in the salad. If an evening meal, the younger children will have a simple supper beforehand; the baby at 5:00 or 5:30 and the three- and six-year-olds at the same time or just afterwards. It is always an advantage to serve the young children at a separate table, at least at night. Often their meal hours do not coincide with those of the older members of the family, and if they come to the adult table they need the attention of some one to supervise their eating. If that person is the mother, she does not have a chance to eat her own meal satisfactorily, and often goes undernourished. The children at their own table are less distracted by foods which they may not share, and more care can be given to their table manners and conversation,—a very important part of their education, for eating habits once formed are hard to break, and good ones are a valuable asset for every child.

The character of the luncheon will depend largely upon the breakfast and the occupations of the different members of the family. In the city, some are likely to be away from home at midday, and luncheon is a less formal meal than where all gather together at noontime.

Having planned the dinner, it is best to decide on the breakfast next. Assuming that a medium-weight breakfast suits this family best we might have:

Breakfast

Oranges
Dark farina with wheat germ, cream
Puffy omelet with bacon
Toast
Coffee for adults
Milk for children

This meal will probably be taken by the family together. The baby may begin with the cooked cereal, leaving the orange juice for a mid-morning feeding. It is desirable to give the children their cod liver oil immediately after breakfast so that it will not be forgotten. If the three-year-old is to have his dinner before the family meal (at 11:30 or 12 o'clock) he will have a mid-morning feeding of orange juice and a mid-afternoon lunch of milk and stale bread or cracker. It is to be hoped that the six-year-old will have a glass of milk or fruit juice or a beverage combining milk and fruit juice served with a cracker in the middle of the morning at school unless this interferes too much with his appetite for the noon meal.

Assuming that luncheon will be served for all the family except the youngest, a suitable menu to fit the day's scheme would be:

LUNCHEON

Creamed chicken on toast
Baked bananas
Boston brown bread and butter
Rice pudding
Tea for adults
Milk for childen

This luncheon will need no modification for the six-year-old except that she should have a piece of day-old whole wheat bread and only a small portion of the fresh Boston brown bread.

The baby can well be served with the three-year-old before the family luncheon if he is eating at home and not at the nursery school. Then both will rest while the mother eats her luncheon. The baby's meal will consist of milk, egg yolk, chopped vegetable, a tablespoonful of chopped prunes and a little stale bread to chew; the three-year-old will have a soft-cooked egg, some toast, some of the chopped vegetable or some of the baked banana served in the regular luncheon, rice pudding, and milk to drink.

In the evening, before the family dinner, the three youngest will have their suppers: the baby, milk and cereal, baked potato, and a little apple sauce; the three-year-old, cereal and milk, bread and butter, a little of the dessert set aside when preparing the family dinner, and milk to drink; the six-year-old, cereal and milk, bread

and butter, apple snow, lady fingers, and milk to drink. It would be an easy matter to arrange for baked potatoes for the children's suppers, since potatoes on the half shell form part of the family dinner, but in this case let us assume that the rice (used also for the three-year-old's pudding) is a left-over from the day before.

Late in the evening (10 P.M.) the grandmother may enjoy a hot, nutritious beverage (such as hot milk, plain or flavored) and a cracker.

This plan shows how it is possible by choosing simple, easily digested foods for the general menu (which are good for everybody), to provide for the special needs of the children without much extra cooking.

Calculation of the Family Dietary

Having now estimated the fuel needs of our family, and planned a menu designed to give everybody something suitable to eat, our next aim is to find out how nearly this will fulfill the theoretical requirements. We must make a list of the amounts to be served and then, by reference to Table I in the Appendix, we can very quickly estimate fuel values for the day. The dietary is given in detail on pages 266-268.

Comparing our totals with the estimated day's requirements, we find that we have slightly exceeded our quota of fuel, and have a very liberal supply of protein, much of which is from milk, so that we know it will satisfy the protein needs of the growing children in the best possible way. The adults will get their protein largely from the halibut, chicken, and eggs, supplemented by milk, cereals, and bread. We have used a little over six quarts of milk, 600 calories of cereal in the form of dark farina with wheat germ and some rice; five eggs and one yolk in addition to those in the egg sauce, apple snow, custard, and lady fingers; about 500 calories in the form of fruit exclusive of the bananas, which in this dietary may be regarded as a substitute for vegetable in our original plan; about 275 in green vegetables (string beans, tomatoes, lettuce, pea pulp); about 1700 in bread, over 2000 as butter, and about 900 as halibut and chicken. The potatoes are not up to

our estimate, because toast with the creamed chicken took the place of potato in the luncheon and the children had cereal for supper, whereas frequently they might have baked potatoes.

The important sources of vitamins in the diet are shown in the following table.

Chief Sources of Vitamins in Family Dietary Number I

Food Material	Vitamin A	Vitamin B_1	Vitamin C	Vitamin G Bourquin-Sherman Units
	International Units			
Apples	126	30	70[1]	45
Bananas	1073	90	900[2]	180
Butter	9600	—	—	—
Eggs	6195	137	—	595
Oranges	390	295	4750	255
Lettuce	85	18	64	23
Milk	9600	702	1300	1900
Peas	278	40	130[3]	35
Potatoes	135	125	680	160
String beans	1808	30	220	60
Tomatoes	2858	85	1700	97
Chicken	—	50	—	190
Dark farina with wheat germ	—	1000	—	456
Boston brown bread	150	98	—	60
Total	32,298	2610	9814	4056

[1] 40% lost in steaming. [2] 10% lost in baking. [3] 10% lost in steaming.

Vitamin A is liberally supplied, having over 200 international units per 100 calories. Vitamin B_1 is less abundantly supplied, but meets actual need, having slightly over 18 international units per 100 calories. Vitamin C is ample, as there are 62 international units per 100 calories, and vitamin G is probably quite liberal with over 25 Bourquin-Sherman units per 100 calories.

Checking up on the minerals, we shall find that our requirement of about 7 grams of calcium per day for the family is met by the milk alone, while the eggs, Boston brown bread, oranges, and string beans furnish a gram more.

A phosphorus allowance of 6 grams is also met by the milk, and fully as much more is furnished by the rest of the diet.

Family Dietary Number I

Fuel Value: 14,760 Calories | Cost: 2¼–2¾¢ per 100 Calories

	Measure	Protein Calories	Total Calories
Breakfast:			
Milk for baby	1 cup	34	170
Milk for 3-year-old	1 cup	34	170
Orange juice for 3-year-old	4 tbsp.	—	32
Oranges for 6	3 large	20	300
Dark farina with wheat germ for all	4 cups	69	575
Omelet for 6			
Eggs	4 eggs	100	280
Milk	½ cup	17	85
Bacon	12 small pieces	39	300
Toast for 6	10 slices bread	70	500
Butter for 6	5 tbsp.	5	500
Milk for older children	3 cups	102	510
Milk for coffee[1] and cereal	3 cups	102	510
Sugar for coffee	2 tbsp. (scant)	—	100
Coffee for adults		—	—
Cod liver oil for children	4 tsp.	—	133
			4165
Mid-Morning Lunches:			
10 A.M.			
For baby:			
Orange juice	3 tbsp.	—	24
For 3-year-old:			
Orange juice	4 tbsp.	—	32
For 6-year-old at school:			
Milk	¾ cup	26	127
Crackers	2 crackers	5	50
			233
Mid-Day Meals:			
11:30 A.M.–12 M.			
For baby:			
Egg yolk	1 yolk	11	56
Bread	½ slice	3	25
Milk	1 cup	34	170
Mashed or chopped peas	1 tbsp.	3	12
Baked potato	½ small	3	25
Chopped prunes	1 tbsp.	1	20
For 3-year-old:			
Egg	1 egg	25	70
Toast	1 slice	7	50
Baked potato	1 small	6	75

[1] The milk is estimated as whole milk throughout, assuming that it will be skimmed, the top used for coffee, cereal, and pudding, and the rest for cooking and drinking.

Family Dietary Number I (*Continued*)

	Measure	Protein Calories	Total Calories
Mid-Day Meals:—(*Continued*)			
Butter	1 tsp.	—	33
Mashed peas	2 tbsp.	6	25
Rice pudding II[1]	¼ cup	12	100
Milk	¾ cup	26	127
			788
Family Luncheon (for 6):			
Creamed chicken on toast	1½ cups 6 slices	144	900
Baked bananas	6 bananas	30	600
Boston brown bread	10 slices	50	500
Butter	5 tbsp.	5	500
Rice pudding II[1]	1½ cups	72	600
Milk for children	2 cups	65	340
Sugar for tea	2 tbsp.	—	100
Tea for adults		—	—
			3540
Mid-Afternoon Lunches:			
For baby:			
Milk to drink	¾ cup	26	127
Cracker	1 cracker	2	25
For 3-year-old:			
Milk to drink	¾ cup	26	127
Crackers	2 crackers	5	50
			329
5:30 p.m.			
For baby:			
Dark farina with wheat germ	2 tbsp.	3	16
Milk for cereal / Milk to drink	¼ cup / ¾ cup	34	170
Bread	½ slice	4	25
For 3-year-old:			
Steamed rice	¼ cup	3	33
Milk for rice	⅓ cup	11	56
Bread	1 slice	7	50
Butter	1 tsp.	—	33
Apple snow	2 tbsp.	—	15
Boiled custard	⅓ cup	13	100
Milk to drink	¾ cup	26	127
For 6-year-old:			
Steamed rice	½ cup	6	66
Milk for rice	½ cup	17	85

[1] See Table II, Appendix.

Family Dietary Number I (*Continued*)

	Measure	Protein Calories	Total Calories
Mid-Afternoon Lunches:—(*Continued*)			
Bread	2 slices	14	100
Apple snow	3 tbsp.	2	33
Boiled custard	⅓ cup	13	100
Lady fingers	2 fingers	10	100
Milk to drink	¾ cup	26	127
			1236
Family Dinner:			
Bouillon for 5	3 cups	63	75
Baked halibut for 5	21 oz. (raw wt.)	366	600
Egg sauce for 5			
White sauce	1 cup		
Egg	1 egg	57	470
Potatoes on half shell for 5			
Potatoes	5 medium		
Butter	2 tbsp	62	656
Milk	¼ cup		
Buttered string beans for 5			
Beans	2¼ cups		
Butter	1 tbsp	23	200
Bread for 5	6 slices	42	300
Butter for 5	3 tbsp.	3	300
Tomato salad for 5			
Tomatoes	4 medium		
Lettuce for 4	8 leaves	20	416
French dressing	4½ tbsp.[1]		
Apple snow for 5	2 cups	18	300
with boiled custard	1⅔ cups	65	500
Lady fingers for 5	10 fingers	40	500
			4317
Night Lunch for Grandmother:			
10 p.m.			
Hot milk	¾ cup	26	127
Cracker	1 cracker	3	25
			152
Total for day		2162	14,760

[1] 7½ tbsp. served; 3 tbsp. lost on plates.

There is not so much leeway on the iron, but an allowance adequate for the family, half a milligram per 100 calories, is covered by the small contributions of many foods, as the following estimate will show.

CHIEF SOURCES OF IRON IN FAMILY DIETARY NUMBER I

FOOD MATERIAL	CALORIES (*Approximate*)	IRON GRAMS
Apples	140	0.0008
Bananas	600	0.0037
Boston brown bread	500	0.0067
Chicken	300	0.0039
Eggs	700	0.0137
Farina, dark, with wheat germ	600	0.0066
Halibut	600	0.0047
Milk	4100	0.0143
Oranges	400	0.0042
Peas	40	0.0005
Potatoes	525	0.0058
String beans	100	0.0028
Tomatoes	100	0.0022

Thus, by following a simple general plan, and using our knowledge of food values to help in arranging an attractive menu, we can get a good family dietary without great difficulty, if we do not have to count cost too closely.

Cost of the Family Dietary

This dietary will probably cost from $3.20 to $4.00 per day, or from two and one-fourth to two and three-fourths cents per 100 calories, depending upon the locality. If milk costs fifteen cents per quart and eggs four to five cents apiece with other foods in proportion, it can be obtained for two and three-fourths cents only with careful buying. With milk at ten cents per quart and eggs not over two and one-half cents apiece, fruit and vegetables correspondingly cheap, it would be possible to purchase such food for about two cents per 100 calories. It must be remembered that in these estimates nothing is allowed for kitchen or table waste, beyond the unavoidable losses in paring vegetables, discarding bones, etc. If the cook spoils food in the kitchen, or leaves

it in the cooking utensils through careless heating or bad scraping; if she is not careful to save every bit of edible food which comes back from the dining room, the food bills will go up, even though the family has no more to eat. Scientifically speaking, bread crumbs have the same food value as freshly cut slices of bread, bits of meat on bones are as nutritious as handsome roasts, sour milk as valuable as sweet. Every calorie thrown away either deprives the family of nutriment which it needs or adds to the total cost of its food supply. At the table there is often much carelessness about leaving food on individual plates, breaking bread or rolls and eating only a small portion, and otherwise performing a kind of "dog in the manger" act, refusing to eat and spoiling the food for others. Careful supervision of the serving will help to prevent this, and children should be early trained to a sense of responsibility about the waste of food. In public places, where strangers are fed, it is not possible to gauge accurately their probable consumption and serve accordingly; consequently the table waste is often great, but at the home table, where individual requirements can easily be studied, there is little excuse for table waste.

A food budget of $2.85 per day means $1000 a year for this item of family expenditure alone. To justify such an outlay, an income of at least three times this amount would be required, to give the family clothing and shelter at all commensurate in quality with the food, and opportunity to satisfy its "higher" or intellectual and spiritual needs, such as education for the children, books, travel, music, entertainments, gifts to church and charity, and other good things which require money.[1]

Reducing the Cost of the Dietary

The majority of families do not have incomes of $3000 or more a year; most housewives must spend less than two cents per 100 calories on their food in order to have money for decent clothing and shelter and any "higher life" at all. Yet all families have need

[1] It is usually estimated that, with an income of $2000 to $4000, 25 per cent will be spent for food, but the family under consideration here is larger than that taken as "typical," the latter including only five persons—two adults and three children under fourteen years of age. A more liberal proportion for food would be justifiable in the present case.

of being well nourished and wish to enjoy some of the esthetic pleasure of a well-set table. Suppose, for instance, that we wish to reduce the cost of the foregoing dietary to about one and three-fourths cents per 100 calories, making a total cost of about $2.50 per day. In our first dietary we have used a liberal supply of fresh fruit and vegetables, and as these are expensive items when considered as sources of fuel, we shall be obliged to cut down the amount somewhat, using only one kind of fresh fruit and one fresh vegetable in a single day, or we may substitute canned or dried fruit for some of the fresh. While the milk seems to occupy a large place, its value and economy have already been demonstrated, and as long as the average cost of the dietary is over one and one-half cents per 100 calories it can be used freely to advantage. In regions where fresh milk costs over 8 cents a quart, the substitution of evaporated milk, at least for cooking, will effect a considerable saving of money. Eggs are usually expensive, and can be omitted for breakfast, in the sauce for the fish, and the dessert, and cookies substituted for the lady fingers. Chicken is an expensive form of meat and while not much is used, the cost could be lowered by substituting dried beef, without changing the form of the menu. The fish used in the dinner is usually not very dear and may be retained. The consommé adds little food value and, unless made of material not valuable for other purposes, can be omitted. Keeping in mind the general program first proposed for this dietary, we may plan a second menu at lower cost.[1]

Menu I	Menu II
Breakfast:	**Breakfast:**
Oranges (very large)	Oranges (smaller)
Dark farina with wheat germ	Dark farina with wheat germ
Cream (top milk) for cereal	Cream (top milk) for cereal
Puffy omelet with bacon	Toast
Toast	Coffee for adults
Coffee for adults	Milk for children
Milk for children	
Luncheon:	**Luncheon:**
Creamed chicken on toast	Creamed dried beef on toast
Baked bananas	Baked bananas

[1] Table III in the Appendix showing groups of foods at different prices will be helpful in this connection.

Boston brown bread
Rice pudding
Tea for adults
Milk for children

DINNER:

Consommé
Baked halibut, egg sauce
Potatoes on the half shell
String beans, buttered
Bread and butter
Tomato salad, French dressing
Apple snow with boiled custard
Lady fingers

Boston brown bread
Rice pudding
Tea for adults
Milk for children

DINNER:

Baked halibut, white sauce
Potatoes on the half shell
String beans, buttered
Bread and butter
Cole slaw
Chocolate blanc mange with thin cream and sugar
Plain cookies

That the second menu will answer the food requirements of the family quite as well as the first can best be shown by the calculation of a dietary.

Consideration of the calories makes it evident that the changes in the menu have not materially affected the fuel value or protein values of the diet. The vitamin content, too, is little altered, for although the tomatoes, apple, and lettuce are omitted, cabbage has taken their place to some extent, and nearly a quart of milk has been added. We are even better off as regards calcium and phosphorus on account of the extra milk. The iron is slightly lower, and the difference might well be made up by the use of whole wheat bread, as is always desirable in economical dietaries for the sake of the vitamin B_1.

It may seem surprising that the protein remains high in spite of the fact that seven eggs used in the first dietary have been left out of the second. The reason is that a quart more milk has been used and the creamed dried beef yields more protein than the creamed chicken. The changes suggested in the fruit and vegetables may not always mean much saving; all depends upon season and locality and general market conditions. But cabbage is usually one of the cheapest vegetables, while fresh tomatoes are often rather dear; fine, large oranges are always more expensive than medium-sized ones, and the reduction in the number of fruits used in the dietary, by the omission of the apples, is also in the nature of an economy, since fruits are always relatively expensive if one has to buy them in the market. The chocolate

Family Dietary Number II

Fuel Value: 14,539 Calories — Cost 2–2¼¢ per 100 Calories

	Measure	Protein Calories	Total Calories
Breakfast:			
Milk for baby	1 cup	34	170
Milk for 3-year-old	1 cup	34	170
Orange juice for 3-year-old	4 tbsp.	—	32
Oranges for 6	3 medium	14	200
Dark farina with wheat germ for all	4⅓ cups	69	600
Toast for 6	10 slices	70	500
Butter	5 tbsp.	5	500
Milk for older children	3 cups	102	510
Milk for coffee and cereal	3 cups	102	510
Sugar for coffee	2 tbsp. (scant)	—	100
Coffee for adults		—	—
Cod liver oil for children	4 tsp.	—	133
			3425
Mid-Morning Lunches:			
10 A.M.			
For baby:			
Orange juice	2 tbsp.	—	16
For 3-year-old:			
Prune juice	½ cup	—	48
For 6-year-old at school:			
Milk	¾ cup	26	127
Crackers	2 crackers	5	50
			241
Mid-Day Meals:			
11:30 A.M.–12 M.			
For baby:			
Egg yolk	1 yolk	11	56
Bread	½ slice	3	25
Milk	1 cup	34	170
Mashed peas	1 tbsp.	3	12
Baked potato	½ small	3	30
Chopped prunes	1 tbsp.	1	20
For 3-year-old:			
Egg	1 egg	25	70
Toast	1 slice	7	50
Baked potato	1 small	6	75
Butter	1 tsp.	—	33
Mashed peas	2 tbsp.	6	20
Rice pudding II[1]	¼ cup	12	100
Milk	¾ cup	26	127
			788

[1] See Table II, Appendix.

Family Dietary Number II (*Continued*)

	Measure	Protein Calories	Total Calories
Family Luncheon (for 6):			
Creamed dried beef	3⅓ cups	212	1040
on toast	6 thin slices	36	240
Baked bananas	6 bananas	30	600
Boston brown bread	10 slices	50	500
Butter	5 tbsp.	5	500
Rice pudding II[1]	1½ cups	72	600
Milk for children	2 cups	65	340
Sugar for tea	2 tbsp.	—	100
Tea for adults		—	—
			3920
Mid-Afternoon Lunches:			
For baby:			
Milk to drink	¾ cup	26	127
Cracker	1 cracker	2	25
For 3-year-old:			
Milk to drink	¾ cup	26	127
Crackers	2 crackers	5	50
			329
5:30 p.m.			
For baby:			
Dark farina with wheat germ	2 tbsp.	3	16
Milk for cereal	¼ cup	34	170
Milk to drink	¾ cup		
Bread	½ slice	4	25
For 3-year-old:			
Steamed rice	¼ cup	3	33
Milk for rice	⅓ cup	11	56
Bread	1 slic	7	50
Butter	1 tsp.	—	33
Boiled custard	⅓ cup	13	100
Milk to drink	¾ cup	26	127
For 6-year-old:			
Steamed rice	½ cup	6	66
Milk for rice	½ cup	17	85
Bread	2 slices	14	100
Chocolate blanc mange	¼ cup	8	100
Plain cookies	2 cookies	6	100
Milk to drink	¾ cup	26	127
			1188

[1] See Table II, Appendix.

FAMILY DIETARY NUMBER II (*Continued*)

	Measure	Protein Calories	Total Calories
Family Dinner:			
Baked halibut for 5	21 oz. (raw wt.)	366	600
White sauce for 5	1 cup	32	400
Potatoes on the half shell	5 medium	62	656
String beans, buttered, for 5	2¼ cups	23	200
Bread for 5	6 slices	42	300
Butter for 5	3 tbsp.	3	300
Cole slaw for 4	2 cups	12	200
Chocolate blanc mange for 5	2½ cups	80	1000
Top milk for blanc mange	2 cups	68	340
Plain cookies for 5	10 cookies	30	500
			4496
Night Lunch for Grandmother: 10 P.M.			
Hot milk	¾ cup	26	127
Cracker	1 cracker	3	25
			152
Total for day		2046	14,539

blanc mange served with top milk gives nearly twice the fuel value of the apple snow and boiled custard, but costs less than one and one-half cents per 100 calories, while the other dessert will cost at least two cents per 100 calories. If these modifications of the first menu do not mean the most effective cost reduction under all circumstances, they will at least show how one may go about the reduction of the cost of food, once a general working plan has been thought out.

Dietaries costing over two and one-half cents per 100 calories are comparatively easy to plan; milk may be used freely, and a variety of fruits and vegetables can be obtained, fresh or canned, with dried ones occasionally for variety. Choice cuts of meat can be provided in moderation, the more expensive kinds being offset by the introduction of a meat substitute or some specially cheap cut now and then. Dietaries costing less than two cents per 100 calories must be given much thought in order to keep them well balanced. Milk becomes a more important item, taking the place, to some extent, of other protein, vitamin, and mineral bearing

foods, especially expensive meats and fresh fruits and vegetables. Eggs must be used very little, except for the young children, and butter confined chiefly to table use if not replaced entirely by a substitute equally rich in vitamin A. In cooking, still cheaper forms of fat may be substituted, such as fat of meats otherwise likely to be wasted.

Dietaries Costing about One and Three-Fourths Cents per 100 Calories

If now we wish to reduce the cost of food to one and three-fourths cents per 100 calories, distinct emphasis will have to be placed on the non-perishable, staple foods, such as cereals and dried fruits and vegetables, which in the main cost from three-fourths of a cent to one and one-half cents per 100 calories, and very careful selection will have to be made of meats and fresh or canned fruits and vegetables. In the family group under consideration, the children require over half the total fuel proposed as a standard. Their food, as already pointed out in the chapters especially devoted to their requirements, cannot be provided as cheaply as that for healthy adults, because of their greater need of the relatively expensive growth-promoting materials—proteins, minerals, and vitamins. When the cost of food is as high as it is in New York City, it is difficult to provide a good dietary especially for children for less than one and three-fourths cents per 100 calories. Milk at fifteen cents per quart can no longer be used freely, and should be reserved for table use, substituting evaporated milk for culinary purposes. When the cost of the dietary must be kept under one and three-quarters cents per 100 calories evaporated milk should replace fresh almost entirely unless the fresh milk costs less than eight cents per quart. Excellent soups can be made for the young children with evaporated milk and the pulp of dried peas, beans, or lentils. The addition of tomato pulp or juice will improve the flavor and add the vitamin C which these foods lack.

In a dietary costing one and three-fourths cents per 100 calories or less the purchase of butter is seldom wise, now that excellent

butter substitutes equally rich in vitamin A are on the market; and still cheaper fats may be used in cookery, including the hardened vegetable oils, suet, tried-out beef fat and fat salt pork. The fact that these fats contain no vitamin A must be borne in mind and a small portion of cod liver oil given daily to each child. For the adults, milk and green and yellow vegetables are important sources of this vitamin.

Dried fruits must be substituted for fresh to a considerable degree. Among the fresh fruits usually cheap are bananas, apples, and at certain seasons oranges. Other fresh fruits must be purchased with care at the time when their cost is at the lowest point. The tomato, which loses very little of its vitamin C in canning must be regarded as the great staple for this vitamin. Bananas are high in fuel value and often low in price. They are at their best when fully ripe, as indicated by brown "freckles" on the skin. All traces of green should have disappeared, even at the ends. Baking them in the skin produces a succulent food of fine flavor. They must be quickly baked until soft and the juice begins to flow, but no longer, or the juice all oozes out and they become tough and dark and lose much of their flavor and attractiveness. Bananas baked before the skins darken will never be as palatable as the fully ripened ones, though they are more digestible than if eaten raw. Unripe bananas are best baked without the skins and basted with a syrup. These may be used as a dessert, while those baked in the skins may take the place of a vegetable in the menu. Bananas can be mashed and stewed with a little water, flavored with lemon juice and sugar, making a palatable sauce. Their vitamin content is similar to that of apples. Dates, raisins, prunes, peaches, and figs may usually be obtained for less than two cents per 100 calories, and their uses are many and varied. Dates, figs, and raisins will make bread crumbs or flour and cheap fat acceptable in the form of steamed puddings or plain cake. Raisins make a good sauce when stewed tender in a little water; their own store of sugar will make it sufficiently sweet. These stewed raisins may be used over rice or cornstarch blanc mange as a change from milk. Dates may also be cooked

soft in a little water, then put through a coarse sieve, making a palatable marmalade without added sugar. The addition of a little sugar and lemon juice will make a better sauce, however. Dates make an excellent filling for sandwiches, likewise figs and raisins. Dates may be served with breakfast cereals, being especially good with wheat preparations. Raisin or date bread will be appreciated by children. The fruit, cut in small pieces, is added to the dough when kneading for the pan. Although the dried fruits are lacking in vitamin C, they add so much to the diet in other ways—fuel, minerals, laxative properties, palatability—their use should be encouraged and their deficiencies made up by other foods,—tomatoes, and various raw vegetables for example.

Stewed figs, served in their own juice or with milk or cream, make a pleasing dessert. Prunes are often badly cooked and consequently are not as highly esteemed as they might be. Long, slow cooking in plenty of water to cover them well is necessary to make them soft and juicy, no sugar being added during the process. When done, they should be moderately sweetened and allowed to stand at least twenty-four hours before serving. They will then be plump and well seasoned to the center. Prunes of the cheapest grades are often little but skin and stone, and even careful cooking will not make them attractive. Hence it pays to buy prunes of good quality. The addition of a few slices of lemon while cooking gives a pleasant change of flavor. Prunes keep well, and there are many uses for them. Prune whip or prune soufflé, made of sifted prune pulp and whites of eggs, is an attractive and wholesome dessert. The juice may be stiffened with gelatin and served as prune jelly. Prunes and brown bread may be baked with milk and eggs like a plain bread pudding. A prune pie may be made with two crusts and a filling of prune pulp thickened with a little cornstarch. Variety can be given to the menu by combinations of the more inexpensive fruits. Dried peaches stewed with raisins, prunes stewed with apricots, dates baked with apples in a pie, are all attractive combinations.

Besides the dried legumes the cheapest vegetables are usually potatoes, kale, cabbage, onions, carrots, turnips, and parsnips.

While tomatoes are somewhat more expensive, their great value as a source of vitamins and especially of vitamin C entitles them to a regular place in the diet. Aside from requirements for certain dietary essentials we relish a diet of pronounced and varied flavor; bread, cereals, beans, potatoes, and the like are too bland to be wholly satisfying. The secret of making a palatable dietary at a low cost is to develop the characteristic flavor of the mild foods as far as possible (usually by long, slow cooking) and to include in the day's ration some of the highly flavored foods. Tea and coffee are desirable for flavor, but they may satisfy the palate when the diet is wholly inadequate. They are a real menace to good nutrition in children. Wisely used, they may be helpful in the adult dietary.

Meat is too expensive a source of protein to be depended upon as its main source. It is to be regarded rather as a source of flavor and of fat. A little salt pork, bacon, or ham will cause a large dish of baked beans to be relished; creamed salt fish or dried beef will make bread (toast) or potatoes more acceptable; a small portion of beef or mutton will give character to a stew of vegetables and dumplings, or to the pastry and gravy which yield most of the fuel in a meat pie.

Aside from the milk, the best sources of protein will be the legumes, including peanuts, especially in the form of peanut butter, and the less expensive kinds of cheese, including cottage cheese. Besides the ordinary baked beans and bean soup, many attractive dishes can be made from the sifted pulp of well-cooked beans of different kinds. It may be molded around a center of seasoned bread crumbs and baked in a loaf to be served with a brown or tomato sauce; or, again, a casserole may be lined with bean pulp, the center filled with corned beef hash, a cover of pulp laid over it, and the dish baked and served with a sauce. Stewed Lima beans are delicious with a mock Hollandaise sauce.

Cheese is valuable for its flavor as well as its food value. It will give flavor to such bland foods as rice, macaroni, bread and hominy in a variety of ways, not fully appreciated by many housewives. It can be successfully combined with potatoes, or

tomatoes, adding to their food value and giving an agreeable change from the ordinary ways of preparing these foods. A rearrangement of Menu II, following these ideas, is given below in Menu III.

Menu II

Breakfast:

- Oranges (smaller)
- Dark farina with wheat germ
- Cream (top milk) for cereal
- Toast
- Coffee for adults
- Milk for children

Luncheon:

- Creamed dried beef on toast
- Baked bananas
- Boston brown bread
- Rice pudding II[1]
- Tea for adults
- Milk for children

Dinner:

- Baked halibut, white sauce
- Potatoes on the half shell
- String beans
- Bread and butter
- Cole slaw
- Chocolate blanc mange with top milk and sugar
- Plain cookies

[1] See Table II, Appendix.

Menu III

Breakfast:

- Bananas (orange juice for two youngest)
- Dark farina with wheat germ
- Milk for cereal
- Toast
- Coffee for adults
- Cereal coffee for older children
- Milk for younger children

Luncheon:

- Macaroni and cheese
- Boston brown bread
- Stewed apricots
- Oatmeal cookies
- Tea for adults
- Milk for younger children
- Cocoa V[1] for others

Dinner:

- Creamed salmon
- Baked potatoes
- Stewed tomatoes
- Bread and butter substitute with vitamin A
- Rice pudding III[1] with evaporated milk sauce

Worked out in detail for the family, as shown in Dietary No. III, this menu fulfills the requirements in spite of the reduced cost. Some changes in the little children's meals will be noted, as well as those for the older children and adults, such as the use of some of the macaroni without the cheese for the three-year-old's dinner, split pea instead of green pea purée, and apple sauce instead of apricots.

FAMILY DIETARY NUMBER III

Fuel Value: 15,801 Calories Cost: 1¾¢ per 100 Calories

	MEASURE	PROTEIN CALORIES	TOTAL CALORIES
BREAKFAST:			
Milk for baby	1 cup	34	170
Milk for 3-year-old	1 cup	34	170
Banana for 3-year-old	½ banana	2	50
Bananas for 6	6 bananas	30	600
Dark farina with wheat germ for all	4 cups	69	575
Toast for 6	12 slices	84	600
Butter for 6	3 tbsp.	3	300
Evaporated milk with added top milk for cereal coffee for children aged 6, 9, 12	1 cup	63	320
Milk for cereal and coffee	3 cups	78	578
Sugar for coffee and cereal for adults, cereal coffee for children	5 tbsp.	—	300
Cod liver oil for children	4 tsp.	—	133
			3796
MID-MORNING LUNCHES:			
10 A.M.			
For baby:			
Orange juice	3 tbsp.	—	24
For 3-year-old:			
Orange juice	4 tbsp.	—	32
For 6-year-old at school:			
Milk	¾ cup	26	127
Crackers	2 crackers	5	50
			233
MID-DAY MEALS:			
11:30 A.M.–12 M.			
For baby:			
Milk to drink	1 cup	34	170
Egg yolk	1 yolk	11	56
Bread	½ slice	3	25
Mashed peas	1 tbsp.	3	12
Baked potato	½ small	3	25
Apple sauce	1 tbsp.	—	20
For 3-year-old:			
Split pea soup	⅗ cup	26	100
Milk to drink	¾ cup	26	127
Bread	1 slice	7	50
Butter substitute with vitamin A	1 tsp.	—	33
Finely chopped creamed macaroni with ½ egg	½ cup	30	160
Apple sauce	⅜ cup	1	100
			878

Family Dietary Number III (*Continued*)

	Measure	Protein Calories	Total Calories
Family Luncheon (for 6):			
Macaroni and cheese	6 cups	204	1200
Boston brown bread	10 slices	50	500
Butter substitute with vitamin A	5 tbsp.	5	500
Stewed apricots	1½ cups	24	600
Oatmeal cookies	6 cookies	88	800
Milk for 6-year-old	¾ cup	26	127
Sugar for adults' tea	1 tbsp. (scant)	—	50
Tea for adults		—	—
Cocoa V[1] for 9- and 11-year-olds	3 cups	115	670
			4447
Mid-Afternoon Lunches:			
For baby:			
Milk to drink	¾ cup	26	127
Cracker	1 cracker	2	25
For 3-year-old:			
Milk to drink	¾ cup	26	127
Crackers	2 crackers	5	50
			329
5:30 p.m.			
For baby:			
Dark farina with wheat germ	2 tbsp.	3	16
Milk for cereal Milk to drink	¼ cup ¾ cup	34	170
Bread	½ slice	4	25
For 3-year-old:			
Cream toast	1½ slices toast 6 tbsp. sauce	20	150
Bread	½ slice	4	25
Rice pudding III[1]	⅓ cup	8	100
Milk for pudding	⅓ cup	11	56
Milk to drink	⅝ cup	19	100
For 6-year-old:			
Cream toast	1½ slices toast ½ cup sauce	33	250
Bread	1 slice	7	50
Rice pudding III[1]	½ cup	12	150
Milk for pudding	½ cup	17	85
			1177
Family Dinner (for 5):			
Creamed salmon	2¾ cups	155	747
Baked potatoes	8 medium	88	800
Stewed tomatoes	2 cups 1 tbsp. butter	23	200

[1] See Table II, Appendix.

FAMILY DIETARY NUMBER III (*Continued*)

	Measure	Protein Calories	Total Calories
Family Dinner (*Continued*)			
Whole wheat bread	10 slices	70	500
Butter substitute with vitamin A	5 tbsp.	5	500
Rice pudding III[1]	4 cups	80	1000
Evaporated milk sauce[1]	1½ cups	95	872
Evaporated milk for coffee	½ cup	32	160
Sugar for coffee for adults	2 tsp.	—	32
Coffee for adults		—	—
			4811
Night Lunch for Grandmother: 10 P.M.			
Tea with ½ cup of hot milk	1 cup	17	85
Sugar for tea	1 tsp.	—	20
Cracker	1 cracker	3	25
			130
Total for day		1883	15,801

[1] See Table II, Appendix.

Family Dietaries at Lowest Cost

It becomes increasingly difficult to provide variety as cost is more restricted. Cereal products, dried peas, beans and lentils, a few staple fresh vegetables such as potatoes, cabbage, kale, and onions, canned tomatoes, dried fruits and one or two fresh ones, such as apples and bananas, the cheaper cuts of meat in limited amounts, with increasing use of fish, especially dried or canned salmon, and milk in liberal amounts, of which the larger part is evaporated, must be the chief reliance of the housewife. The temptation is often great to use large quantities of sugar and syrup or molasses, but it must be borne in mind that sugar furnishes calories only and is sure to reduce the proportion of minerals and vitamins in the diet when used too freely. The minerals and vitamin B_1 in the whole grain cereal products and the dried legumes assume greater importance when fruits and vegetables must be limited and it is worth while to try to make acceptable as much oatmeal, cornmeal from the whole grain, buckwheat, whole wheat flour used in various ways, dried peas, beans, lentils and

peanut butter as one possibly can. Soy beans deserve more attention than they usually receive as they have proteins of excellent quality and are rich in vitamin A as well as vitamin B_1. One should always be on the watch for good sources of vitamin C to supplement the regular use of canned tomatoes (or fresh ones when they are cheap or grown in one's own garden). Dandelions, watercress, beet tops, turnip tops, mustard greens, sorrel and the like are often to be had for the picking and are rich sources of vitamin A as well as vitamin C. The needs of growing children cannot easily be met when the cost of the dietary is reduced below one and one-half cents per 100 calories, except in districts where milk, fruits and vegetables are exceedingly cheap. The following menu and dietary illustrate what can be done for about one and one-half cents per 100 calories.[1]

Menu IV

Breakfast: Orange juice for 6-year-old
Oatmeal with milk and sugar
Bread
Pork fat
Sausage for father and mother
Coffee for adults
Cereal coffee (half evaporated milk) for older children
Milk for youngest children

Luncheon: Baked Lima beans with cheese and tomatoes
Cabbage salad
Brown bread
Butter substitute with vitamin A
Apple sauce
Oatmeal wafers
Tea for adults
Milk for youngest, cocoa for older children

Dinner: Tomato juice
Beef stew with vegetables
Whole wheat bread
Butter substitute with vitamin A
Date pudding with evaporated milk sauce
Milk for youngest, cocoa for older children

[1] Further suggestions for menus at low cost may be found in "Diets to Fit the Family Income," Carpenter, R. S., and Stiebeling, H. K., United States Department of Agriculture, Farmers' Bulletin No. 1757 (1936), procurable from the Superintendent of Documents, Washington, D. C. for five cents in coin, and also in "Three Meals a Day" furnished gratis by the Metropolitan Life Insurance Company, New York City.

Family Dietary Number IV

Fuel Value: 15,225 Calories — Cost: 1½¢ per 100 Calories

	Measure	Protein Calories	Total Calories
Breakfast:			
Milk for baby	1 cup	34	170
Oatmeal for baby	2 tbsp.	3	16
Milk for 3-year-old	1 cup	34	170
Orange juice for 6-year-old	3 tbsp.	—	24
Oatmeal for 7	4½ cups	60	600
Sausage for 2	¼ lb. (raw wt.)[1]	100	500
Bread for 6	12 slices	84	600
Evaporated milk for cereal coffee for children aged 6, 9, 11	1 cup	63	320
Milk for coffee for adults	½ cup	17	85
Milk for cereal	2 cups	68	340
Sugar	8 tbsp.	—	480
Cod liver oil for children	4 tsp.	—	133
			3438
Mid-Morning Lunches:			
10:00 A.M.			
For baby:			
Orange juice	2 tbsp.	—	16
For 3-year-old:			
Orange juice	3 tbsp.	—	24
For 6-year-old at school:			
Milk	¾ cup	26	127
Crackers	4 crackers	10	100
			267
Mid-Day Meals:			
11:30 A.M.–12 M.			
For baby:			
Milk	1 cup	34	170
Bread	½ slice	3	30
Mashed peas	1 tbsp.	3	12
Baked potato	½ small	3	30
Chopped prunes	1 tbsp.	—	20
For 3-year-old:			
Lima bean soup	⅗ cup	19	110
Bread	2 slices	14	100
Butter substitute with vitamin A	2 tsp.	—	66
Baked potato	1 small	9	80
Apple sauce	¼ cup	—	67
Milk to drink	½ cup	17	85
			770

[1] Fat used on bread.

Family Dietary Number IV (*Continued*)

	Measure	Protein Calories	Total Calories
Family Luncheon (for 6):			
Baked Lima beans with cheese and tomatoes	¾ cup dried beans, 2 oz. cheese, ½ cup tomatoes	136	725
Boston brown bread	10 slices	50	500
Butter substitute with vitamin A	5 tbsp.	5	500
Cabbage salad	1½ cups	8	200
Apple sauce	2 cups	5	533
Oatmeal wafers	8 wafers	88	800
Cocoa V[1] for children	4 cups	153	892
Sugar for adult's tea	2 tbsp. (scant)	—	100
Tea for adults		—	—
			4250
Mid-Afternoon Lunches:			
For baby:			
Milk to drink	¾ cup	26	127
Cracker	1 cracker	2	25
For 3-year-old:			
Milk to drink	¾ cup	26	127
Crackers	2 crackers	5	50
			329
5:30 p.m.			
For baby:			
Oatmeal	3 tbsp.	4	25
Milk for cereal / Milk to drink	½ cup / ¾ cup	42	212
For 3-year-old:			
Cream toast	1 slice, 6 tbsp. sauce	20	150
Bread	1 slice	7	50
Butter substitute with vitamin A	1 tsp.	6	33
Rice pudding III[1]	⅓ cup	8	100
Milk for pudding / Milk to drink	¼ cup / ¾ cup	34	170
For 6-year-old:			
Cream toast	1½ slices, ½ cup sauce	33	250
Rice pudding III[1]	⅔ cup	16	200
Milk for pudding	½ cup	16	84
			1274

[1] See Table II, Appendix.

Family Dietary Number IV (*Continued*)

	Measure	Protein Calories	Total Calories
Family Dinner (for 5):			
Tomato juice	2 cups (scant)	17	100
Beef stew with vegetables	4¾ cups	183	1132
Whole wheat bread	10 slices	70	500
Butter substitute with vitamin A	5 tbsp.	5	500
Date pudding I[1]	5 servings	50	1000
Evaporated milk sauce	1 cup	63	420
Cocoa V[1]	5 cups	182	1115
			4767
Night Lunch for Grandmother: 10:00 p.m.			
Tea with ½ cup hot milk	1 cup	17	85
Sugar for tea	1 tsp.	—	20
Cracker	1 cracker	—	25
			130
Total for day		1878	15,225

[1] See Table II, Appendix.

Fruit has been taken out of the breakfast and used at luncheon for all but the three youngest, who have orange juice either at breakfast or at their mid-morning lunch. Oatmeal takes the place of the dark farina purchased with added wheat germ. If possible, a little wheat germ, bought separately, should be added at the time of serving the oatmeal. In the vicinity of a mill the wheat germ may be obtained for a few cents a pound, but when put up in cans for the market it will cost forty or more cents per pound according to the brand. When it costs less than forty cents a pound it is cheaper at the present time to add half an ounce of wheat germ per 100 calories of oatmeal than to buy any other cereal preparation that would furnish the same amount of vitamin B_1. Lima beans with cheese and tomatoes have been substituted for macaroni and cheese, thus increasing the iron, vitamin B_1 and vitamin C obtained from that dish. Apple sauce has taken the place of apricots, effecting a considerable saving wherever apples are a local crop. Because fruit has been omitted for breakfast, cabbage salad has been added to the luncheon menu and tomato

juice to that for the dinner to give equivalent vitamin C. Oatmeal wafers, made without eggs, take the place of oatmeal cookies. Date pudding with whipped evaporated milk sauce, substituted for rice pudding, furnishes a considerable part of the daily milk allowance of the adults and the dates and whole wheat flour in the pudding add to the iron and vitamin B_1 content of the diet. Beef stew with vegetables is alternate to creamed salmon, and makes it possible to use to excellent advantage the vegetables which must recur in the low-priced dietary with a good deal of regularity. Sausage has provided the father and mother, who probably do considerable muscular work, with a food that delays the onset of untimely hunger pangs. The fat which fries out of the sausage is accounted for as the "drippings" in the date pudding recipe.

Some changes have been made in the children's meals either for economy or to save extra cooking, or to furnish a more easily digested food than that in the menu for the older members of the family. The egg has been omitted from the baby's noon meal, but this should not happen every day. An egg yolk should be given two or three times a week even if it cannot be afforded oftener, and once or twice a week beef liver, steamed carefully to keep it soft and rubbed to a paste, should supplement the egg. Baked potato with a fairly liberal portion of a butter substitute with vitamin A takes the place of the macaroni with egg for the three-year-old. The use of whole wheat bread to increase the iron for these two younger children would be advantageous.

Reduction of Cost Without Sacrifice of Nutritive Value

In the four dietaries described in this chapter, the changes in food selection to lower cost have been made without any decrease in nutritive value. The calories from milk, for instance, are as high in the cheapest dietary as in the most expensive, economy being achieved by substitution of evaporated for fresh. Fresh fruit has decreased and dried increased as the cost has been lowered, and appreciable savings have resulted from reduction in the amount of meat and the substitution of cheese and dried legumes. Less expensive fats have been used in the cheaper

dietaries, and the amount has also been reduced, but care has been taken that there should be no inadequacy of vitamin A. The following table shows the changes in the proportion of calories from various sources in these four dietaries.

CHANGES IN THE PROPORTIONS OF CALORIES FROM VARIOUS SOURCES IN FAMILY DIETARIES I, II, III, AND IV

Food	Dietary No. I	Dietary No. II	Dietary No. III	Dietary No. IV
	Calories	*Calories*	*Calories*	*Calories*
Milk	4100	4700	4500	4200
Eggs	660	140	90	—
Fresh fruit	1150	850	750	100
Dried fruit	20	70	500	390
Bread, cereals and flour	2800	3000	3750	2950
Butter or butter substitute with added vitamin A	2500	2250	2000	1200
Meat and fish	900	800	160	200[1]
Cheese	—	—	300	250
Sugar	750	800	1200	1425
Fresh vegetables	780	700	910	554
Dried vegetables	—	—	90	530

[1] This is the value for lean meat. The fat obtained with the meat amounts to 910 calories.

Chapter XV

FOOD FOR THE SICK AND CONVALESCENT

A DISCUSSION of the problems of feeding a family would be incomplete without some reference to the care of the sick and convalescent. Few families are so fortunate as to escape illness entirely. Good feeding is one of the greatest factors in maintaining health, but it must be supported by other conditions fostering nutrition, such as sanitary and cheerful surroundings, freedom from chill, exhaustion, overwork, or worry. A well-fed person is much better able to resist the attacks of harmful bacteria than an undernourished one, but if their number is very great on account of impure water or food, they may overwhelm even strong defenses. Thus the best care to set a well-balanced table may fail to maintain health if the housewife works without the help of the community in securing a sanitary environment. Personal infringements of the laws of health, other than those in regard to food, undermine the resistance of the body to disease; fatigue and chill, for instance, often pave the way to colds and indigestion, which in their turn lower resistance still more. Then a stray germ which would be promptly destroyed if the person were in vigorous health may find a favorable soil in which to flourish. So, in one way or another, illness may enter the home where food is dispensed with intelligent care, and special adaptations of the diet to the needs of the patient have to be considered.

When the case is serious enough to demand the care of a physician, he should give advice concerning the diet, and his directions should be implicitly obeyed. It requires knowledge and experience to diagnose disease and prescribe suitable food, and no book can take the place of the skillful doctor. In sickness, far more than in health, every person is a law unto himself and all rules must be

modified according to the requirements of the individual. This can be done successfully only by one who is able to judge accurately the patient's true condition.

The physician's advice is, however, often very general, especially where the diet is not a prominent factor in the treatment, and the home nurse is frequently at a loss to know how to carry out his instructions to the best advantage. She must obey the doctor, please the patient, and not over-strain the family pocketbook; sometimes the three seem quite irreconcilable. Moreover, many minor disturbances for which no physician is called require some modification of the ordinary family diet. The better the general principles of feeding are understood, the more successfully such emergencies can be met, especially if this knowledge is supplemented by some acquaintance with the lines of dietetic treatment which have proven most successful in practice.

At the outset one must free one's mind from any notion that any particular food is a specific for any disease. As has already been pointed out there are in health many choices of food, whether for fuel, building, or regulating materials. So in sickness, though the range of choice may be more limited, some flexibility is usually possible. There is no magic diet for any disease. Even in the well-known case of diabetes, where the power to utilize carbohydrates is reduced to a low plane or lost, the avoidance of certain articles of food, while it may be important, is by no means the only feature of the diet. The aim of this chapter is to point out a few dietetic procedures which conform to the general principles involved and which have been shown by experience to be "safe and sane." For more detailed suggestions and other modes of treatment, the reader must consult the specialist in nutrition or refer to the writings of experts in the treatment of any particular disease.[1]

Food Requirements in Sickness

In sickness, as in health, the internal work of the body goes on at the rate of about two-fifths of a calorie per pound per hour dur-

[1] Much practical information about feeding in disease is to be found in *Treatment by Diet*, Barborka, C. J., J. B. Lippincott Co. (1934), or *Nutrition and Diet in Health and Disease*, McLester, J. S., 3rd Edition, W. B. Saunders Co. (1939).

ing sleep and about three-fifths of a calorie per pound per hour during waking hours spent in bed. Seldom is the expenditure of energy less in sickness than under the same conditions of activity in health, and it may be more, particularly in cases of fever. In the first few days of illness, fasting or taking of very little food does no harm and has the advantage of giving the digestive tract a chance to rest. But the energy for body work must still be supplied, so it is drawn from the reserves of the body itself at the rate of about one-half a calorie per pound per hour for the 24-hour day, if the patient is lying quietly in bed; in other words, a man of average weight, confined to his bed, will need about 1850 calories per day. How long it will be wise to depend upon the body to furnish its own fuel wholly or in part depends upon circumstances. In disturbances of short duration, such as attacks of acute indigestion, it is quite safe to fast one to three days, or until the cause of disturbance is removed. Nature will quickly bring the digestive tract back to normal, so that in a few days a simple diet ample for all body needs can safely be taken. But in disease which is likely to run a long course and draw severely upon body tissues, food for fuel must be supplied as nearly as possible in accordance with energy expenditure, to save the patient from being very much weakened and having to undergo a long period of convalescence to regain what he has lost. The need for protein continues whether the person be sick or well. The body carries a certain amount of reserve protein, which can be drawn upon in emergencies, but as a rule minimum requirements should be met. In the case of growing children it is important that sufficient protein be provided for normal development. At least ten protein calories per 100 calories of food will meet these needs.

Mineral requirements are not decreased in most types of illness. The physician may, in certain diseases, order a definite change in some particular mineral, as more iron, or less common salt, but unless there are specific orders to the contrary, the diet should provide all mineral elements as liberally as when the person is well. When the usual sources are restricted—if for instance milk is prohibited—some special source of the minerals so withdrawn should be furnished.

The same is true with regard to the vitamins, with the additional consideration that in case of fevers or other infectious diseases there is a greatly increased need of vitamin A, B_1, and C. Diarrhea and vomiting result in loss of vitamins B_1 and C, and since the body carries little reserve of either it is important that these losses be made good at the earliest possible moment. Otherwise, appetite and digestion become poorer and poorer and danger of more serious symptoms of deficiency becomes imminent. The recognition of these dangers has greatly improved modern diets for the sick.

Fluid Diet

When for any reason a person is below par physically, care must be taken to provide a diet easy of digestion. Some of the ways in which this may be done have already been considered in Chapter II. Since all food must eventually be reduced to fluid form for absorption, a liquid diet is usually regarded as the type easiest to digest, and is often prescribed by the physician. By this he means a diet which includes: (1) broths and clear soups of various kinds; (2) mild fruit juices; (3) cereal gruels; (4) milk, either plain or modified in such a way as to make it more digestible, more nutritious, or more attractive to the patient; (5) raw eggs in combination with milk, fruit juices, cocoa, or other fluid; (6) cream soups of various kinds.

Broths and clear soups have little or no nutritive value. Their chief virtues are that they are agreeable to the taste, comforting when hot or refreshing when cold, and when they contain meat extracts (as they usually do) stimulating to the flow of the gastric juice. Their fuel value is negligible, anywhere from one to several quarts being required to yield 100 calories; but broths can be made the carriers of extra nutriment by the addition of eggs, or by thickening with cereal flours, such as barley or rice flour.

Fruit juices can be chosen which are rich in vitamin C, or this vitamin may be added as pure ascorbic acid (available in tablet form), or an excellent fruit beverage rich in vitamin C can be made from a special preparation consisting of dried orange juice, sugar and ascorbic acid.[1]

[1] For description consult *Accepted Foods*, American Medical Association (1940).

Cereal gruels are sometimes useful when fluid is necessary and the digestive and assimilative powers very weak. Made from plain cereal flour, about 4 tablespoonfuls to the quart, they have a fuel value of only 70 to 90 calories per quart. If the gruel is dextrinized, using about six times as much cereal per quart, the fuel value can be increased to from 400 to 600 calories. Dextrinization is accomplished by adding to the cooked cereal, when cooled to about 100° F. a small amount of malt diastase, which rapidly liquefies it. Like broths, gruels may be enriched by the addition of eggs, cream or milk. Vitamin B_1 can be added as the pure thiamin, available in tablet form, or the nutritive value may be increased in several respects by using one of the special cereal foods now available for infants and invalids.[1]

Milk is one of the most valuable foods for the sick room. It is for most people easy of digestion in its natural state, and can be made still easier to digest in various ways. Its usefulness can often be increased (1) by changing its flavor, which is not always agreeable, especially to adults, (2) by altering the relative proportions of protein, fat, and carbohydrate, or (3) by combining it with something which prevents the formation of large or hard curds in the stomach. Just how milk shall be prepared depends upon the individual to be fed. "Some like it hot, some like it cold," and a few like it warm from the cow. Those who find its sweetness unpleasant often enjoy the mild acid flavor of buttermilk and zoolak or the faint tang of fermented milk (koumiss). Coffee, tea, or cocoa may be added for flavor; malted milk not only changes the taste but adds to the fuel value and ease of digestion.

A very simple modified milk diet can be made by adding cream and milk sugar to whole milk. For example, one and a half quarts of milk, one cup of gravity cream (18.5 per cent fat) and four ounces of milk sugar will provide 2000 calories, furnishing seven feedings of about one cup each, enough to meet the daily energy requirement of a man in bed unless his disease is one which greatly increases the energy requirement. Vitamin C can be added

[1] For description of these "special purpose foods" consult *Accepted Foods*, The American Medical Association (1940).

as pure ascorbic acid; or one or two ounces of orange or lemon juice, the latter diluted with water, can be given between the milk feedings.

What are known as albuminized beverages are in reality combinations of white of egg with various fluids, such as milk, broth, fruit juice or cereal gruel to make a soothing drink of some nutritive value, to be taken when the irritability of the digestive tract is particularly great. The white of one egg has a fuel value of 13 or 14 calories, but one white combined with half a cup of milk results in a drink yielding nearly 100 calories. One white plus the juice of a medium sized orange and a tablespoonful of milk sugar will make a mixture supplying about 75 calories and significant amounts of vitamins B_1 and C. More nourishment is gained by introducing the yolk as well as the white of the egg. An eggnog made with one egg, three-fourths of a cup of milk, two teaspoonfuls of sugar and a little vanilla for flavoring will yield about 230 calories and furnish significant amounts of protein, minerals and vitamins except vitamin C, which could be added by dissolving in the beverage a tablet of the pure vitamin.

Cream soups furnish hot fluid of considerable nutritive value, and are of service in relieving fatigue and getting relaxation. They generally owe their food value largely to milk and are to be regarded as among the means of making milk acceptable in a monotonous dietary program. Several illustrations of the nutritive value of cream soups will be found among the Dietary Recipes, Table II, in the Appendix. Cream of tomato soup offers an excellent means of getting vitamin C into the diet when for some reason acids tend to be irritating to the throat or stomach, for the acid of the tomato combines with the proteins of the milk and is no longer irritating.

If a fluid diet is to be maintained only for a short time (a few days) no attempt is usually made to meet the full energy requirement of the patient, but it should carry as nearly as possible all the minerals and vitamins which would be furnished by an adequate diet of full energy value. It should be given in small amounts at frequent intervals. A liquid meal leaves the stomach

quickly and enters the circulation quickly. If meals are too far apart, less food is given than the patient can advantageously take. If too large amounts are given at one time, too much work is thrust upon the enfeebled system or the patient becomes appalled at the task and refuses to eat.

When a fluid diet is to be given over a considerable period of time, running into weeks, more attention must be paid to meeting the full food requirements of the patient. To keep the food dilute and still administer 1800 or more calories per day, it is sometimes necessary to provide food every two or three hours throughout the whole twenty-four. An example of such a diet, furnishing 2000 calories, in ten feedings, is given below.

A Fluid Diet Furnishing 2000 Calories

4 A.M.	1 cup orange juice with 2 tbsp. lactose
6 A.M.	1 cup milk
8 A.M.	1 cup gruel: one tbsp. pablum,[1] ¼ cup cream, ½ cup milk
10 A.M.	Eggnog: one egg, ¾ cup milk, 1 tbsp. lactose, 1 tsp. sugar, vanilla, speck salt
12 M.	1 cup cream soup: ⅓ cup pea pulp, ⅓ cup cream, ⅓ cup milk
2 P.M.	1 cup pineapple juice with 1 tbsp. lactose
4 P.M.	Eggnog as at 10 A.M.
6 P.M.	Cereal gruel as at 8 A.M.
8 P.M.	1 cup milk
12 A.M.	Eggnog as at 10 A.M.

This diet is not only sufficient to meet the energy needs of a person of average size lying in bed, but it is ample in protein and is enriched as to calcium, phosphorus and iron and vitamins A, B_1, C and G to at least double the usual allowance for a normal adult.

Soft or Semi-Solid Diet

The so-called soft or semi-solid diet represents an intermediate step between fluid diet and a very simple, wholesome, mixed diet, the latter often designated in hospitals as light or convalescent diet. Soft diet is generally more acceptable to the patient than a wholly fluid diet, and has the advantage of less bulk in proportion to nutritive value. The foods most commonly included are any

[1] A specially enriched cereal for infants and invalids. For other foods of this type consult *Accepted Foods*, The American Medical Association (1940).

of the fluid foods mentioned in the preceding section and, in addition, a considerable variety of simple dishes, such as porridge made with specially enriched cereal foods, toast softened with milk, or broth; cream of vegetable soups; custards, baked, steamed or "boiled"; whips, soufflés, junkets, blanc mange, gelatin jellies, ice creams, ices, and sherbets. Meats and fish are omitted and green vegetables given with caution, usually in purée or soup. The following menu will give some idea of what foods are appropriate. It will yield from 2000 to 2200 calories, and is liberally supplied with minerals and vitamins, as well as proteins of the best quality.

A Typical Menu for a Soft or Semi-Solid Diet
Furnishing 2000–2200 Calories

6 A.M.	1 cup hot milk (may be flavored with tea or coffee)
8 A.M.	½ cup orange juice
	⅔ cup cooked farina with added vitamin B_1
	½ cup thin cream for cereal
	1 thin slice toast with butter
10 A.M.	½ cup orange juice
12 M.	¾ cup cream soup
2:30 P.M.	½ cup prune juice with 1 tbsp. lemon juice and 1 tsp. sugar
5 P.M.	1 cup hot milk, flavored with tea, coffee or cocoa
	1 thin slice toast with butter
7 P.M.	½ cup vegex bouillon
	A one-egg omelet
	1 thin slice toast with butter
	½ cup junket flavored with cocoa or caramel
10 P.M.	1 cup gruel or malted milk
	1 thin slice toast with butter

Light or Convalescent Diet

The treatment of convalescence depends, of course, upon the nature of the disease. The severity and duration of the attack, the strength of the patient, and the nature of the diet during the acute stage are all factors to take into account in directing the diet during recovery, and no rule will exactly fit every case. But we may assume that the digestive tract will participate in the weakness of the rest of the body, even when not itself the seat of disturbance, and regard special attention to the diet as essential to rapid and complete restoration to health. If a fluid diet has been given, it will be followed by a semi-solid one, and this in

turn by one more like the patient's ordinary diet, but free from any foods which might overtax the system. When no special directions are given, except to take a "light" diet, it is permissible to provide a fairly liberal food supply, allowing some surplus over daily energy requirements to replenish depleted cells and restore lost weight, but seeing to it that the extra amount is not so great as to upset digestion at any time. For adults an allowance of from 2200 to 2500 calories per day is usually sufficient, since convalescents are not indulging in active exercise. Aside from such regulations as the physician may indicate, the main point is to limit the diet strictly to foods that are not likely to disturb digestion, and to see that building and regulating materials are generously represented. Some of the ways of adapting food to digestive difficulties have been discussed in Chapter II, and many of the suggestions made in regard to selection of food for children (Chapters VIII-XI) can be applied to the convalescent. It is well to keep in mind also the following points:

1. The diet should be simple—only a few kinds of food at a time, and those plainly but very carefully cooked and seasoned.
2. Meals should be served with strict regularity; fifteen minutes of waiting may destroy all desire for food.
3. The appetite should be tempted by the appearance of the tray—attractive dishes neatly arranged, no food slopped over, hot dishes hot and cold dishes cold *when they reach the patient*, a pleasant surprise in the shape of a pretty garnish, a flower, or a gay serving dish.

The following outline shows the type of food which should be chosen.

General Plan for a Convalescent Diet

Breakfast:	½ cup orange juice
	Small serving of cereal, either cooked or ready-to-eat (giving preference to those with added vitamin B_1 or adding a small portion of wheat germ)
	½ cup thin cream for cereal
	A soft-cooked egg
	A thin slice of toast, and butter
	Coffee or tea, half hot milk; or a glass of milk
10:30 a.m.:	A cup of milk or an eggnog or a glass of fruit juice
Luncheon:	Meat broth with rice, barley or vermicelli; or cream soup (potato, pea, asparagus or tomato)
	Roast or broiled lean meat (beef, chicken, lamb); or fish
	Potatoes, baked, boiled or mashed; or macaroni or rice

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"It is the reflection of good physical health in a child's character which makes the effort to improve his health most worth while."—Chaplin, *Signs of Health in Childhood*

	Buttered green or yellow vegetable (spinach, carrots, peas, asparagus tips)[1] Toast, stale bread or plain crackers and butter A simple dessert (ice cream, custard, lemon milk sherbet, junket, gelatin jelly, or mild stewed fruit) A cup of milk
3:30 P.M.:	½ cup mixed fruit juice (grapefruit and pineapple, prune with a little lemon juice, orange and grapefruit); or orange juice
SUPPER:	An omelet, soufflé, or small lamb chop Toast, or a small baked potato, or rice A cup of milk Stewed or baked fruit (prunes, apples, pears, bananas)
10 P.M.:	A cup of hot malted milk

[1] Small cans of chopped vegetables, offered especially for young children, are excellent for use in invalid feeding.

Diet in Minor Illness

There are many times when diets of the types indicated above (fluid, semi-solid, and light or convalescent) may be profitably employed. On occasions of strain, nervous or otherwise, the digestive functions are likely to be depressed, and if given their usual amount of work to do may rebel and precipitate a fit of acute indigestion. If, however, the diet is made lighter for a few days, they will regain their normal state with no mishaps. A light meal is always in order when one is weary; passing quickly into the circulation, it helps to relieve the sense of fatigue. Nutritious soups are excellent for this purpose; so are milk toast, bread, rice, or other cereals with milk, especially if the milk or the cereal is taken hot.

Colds and influenza are often contracted because of weariness or exhaustion, and frequently accompanied by constipation. At first a light laxative diet of low fuel value is best—hot lemonade or orangeade, broths or gruels with crisp toast, baked potatoes, mild stewed fruits and vegetables being the chief articles of diet. This should be followed in a few days by one of full fuel value, and as soon as the cold seems to be "broken" by one of a high vitamin value to aid the body in complete recovery. Liberal use of milk, eggs, and fruit juices (including tomato juice), and additional vitamin A in the form of cod liver oil or one or two capsules daily of halibut liver oil should be continued for some time after all traces of the cold seem to be gone; otherwise it may hang on

a long time and even be the beginning of more serious troubles, such as chronic catarrh, bronchitis, pneumonia, or even tuberculosis. Infection causes the body to lose its reserves of vitamins and interferes with their full use, so that larger amounts than usual are necessary. These effects persist after the infection appears to have cleared up, hence a diet especially rich in vitamins is of inestimable value in restoring full health and vigor.

Acute Indigestion

During an attack of acute indigestion it is best to refrain from food, or to take only broth, tea, diluted orange juice, or milk for a day or two, until the irritated digestive tract has partially recovered, then to take a semi-solid diet, followed by a light diet, as outlined previously. Fruit and vegetables must be introduced again cautiously. Baked potatoes, baked apples, stewed apricots, and prunes are safest to begin with. Bread should be oven-dried or toasted crisp. Eggs, lean roast or broiled meat and fish, oysters, buttermilk, butter, cream, and bacon are all desirable. Underfeeding for a few days is better than over-feeding in such a case. Only small quantities should be taken at one time. The following menu illustrates what may well be taken as soon as comparative comfort has been secured by rest and lighter feeding.

Menu for Diet in Convalescence from Acute Indigestion

7 A.M.	A cup of hot water with ¼ tsp. vegex
8 A.M.	Breakfast:
	Coffee with hot milk
	Soft-cooked egg
	Small serving of bacon
	Two thin slices of toast with butter
10 A.M.	A glass of buttermilk or sweet milk (the latter preferably hot) and a plain cracker
12:30 P.M.	Dinner:
	Small serving of lean roast meat, chop, or broiled steak
	Pulled or toasted bread with butter
	Cup custard, junket, or cornstarch blanc mange
	Milk or tea or coffee half milk, to drink
3:30 P.M.	A glass of milk (or buttermilk)
6 P.M.	Supper:
	Cup of broth with vegex
	Milk toast or omelet with dry toast
	Bread, tapioca, or other cereal pudding
	Half a glass of orange juice

Diet in Food Allergy

Food allergy is a sensitiveness to some specific food or foods which may manifest itself only by a slight itching of the skin or watering of the eyes, or by a very severe eczema, asthma, or acute indigestion. The tendency to be sensitive to some particular food or foods which ordinarily are not harmful seems to run in families. Children whose parents have allergy are likely to show symptoms of sensitivity in infancy, but different symptoms may appear in the same person at different ages. Fatigue or emotional disturbance tends to intensify the difficulty, and various external conditions, as climate, extreme heat or cold, dust and smoke may cause symptoms to appear at certain times and not at others.

Proteins are considered to be the factors in food mainly responsible for food allergies. The amount necessary to bring about a reaction is exceedingly small. Thus people sensitive to honey are thought to be affected by the proteins of the grains of pollen mixed in the honey.

In searching for the cause of allergy no detail of the patient's life should be overlooked. What is usually confusing is that the foods to which he is sensitive are eaten every day. The foods most responsible for eczema, urticaria and gastro-intestinal troubles are wheat, milk, eggs, chocolate, cabbage, tomatoes, oranges, cauliflower, potato, oats, pork, carrots, bananas, strawberries, and walnuts, in order of decreasing frequency. When a digestive disturbance comes at intervals, the cause may be found by making a written record of all the unusual foods consumed in the 24 hours preceding an upset, or of any foods used in extraordinary amounts. Trouble sometimes comes from partaking too freely of some food which would cause no symptom if eaten less frequently and in smaller quantities. This is true of fruit juices, which are coming to be a staple in the modern American diet for both sick and well. The advantages are many, but too large quantities of one kind daily over long periods sometimes leads to sensitivity not only to that particular kind of fruit, but to all botanically related kinds. In trying to locate a food allergy it must also be borne in mind that an attack of acute indigestion may be due to some other cause, as eating when emotionally upset.

When distress occurs after every meal, one way of seeking the offending food is to take for a few days a so-called "elimination diet" containing only foods which seldom give trouble, as for instance one of lamb chops, rice and canned pears, with sugar and butter. Each meal will consist of one or two chops, steamed rice and butter (or butter and sugar), and pears. If no difficulties result in three or four days, foods under suspicion can be tested, one at a time, beginning with those which are the most important staples in the diet, such as: beef, potato, carrots, turnips, asparagus, string beans, rye wafers, thin toast and oatmeal. Milk is best tested by adding to the elimination diet a pint to a quart a day of milk which has been boiled—or using the equivalent in the form of evaporated milk. Heating may change the proteins so that they no longer cause trouble.

If the situation is a difficult one, and the person is perhaps sensitive to a number of foods a physician will make a "skin test." A long time ago it was discovered that if the skin of a hay fever patient was scratched lightly and pollen rubbed into the spot, a hive or urticarial wheal would be produced if the person was sensitive to that kind of pollen. A large number of proteins have in recent years been prepared for use in skin tests. A series of scratches is made on the arm and into each is dropped a small portion of a solution containing protein from a suspected food. One or more of the tests may show the characteristic reaction, and on the basis of this test a diet may be planned, avoiding the troublesome foods. It is very important to exclude these completely. On a wheat-free diet not a crumb of bread nor a taste of a sauce made with wheat flour is permissible. No commercially prepared food may be used unless it is definitely known to be free from any form of wheat whatsoever. On a milk-free diet no butter, cheese or cream is allowable. Home cooking becomes a necessity if one is to have an adequate and varied diet. Commercial baked goods of all kinds, bread, crackers, cookies, etc., are likely to be made with milk or butter or both. Ice creams, sherbets, malted milk, milk chocolate, caramels and other kinds of candy are made with milk. Care must even be taken to see that cooking utensils are absolutely free from traces of milk. After symptoms have been

relieved for a few weeks, butter may be added and if this is not followed by an unfavorable reaction, cream may be tried next. A program of desensitization will probably be begun as soon as a satisfactory diet has been established, giving very minute quantities of milk at first, and if these cause no unfavorable symptoms, gradually increasing the dose until desensitization is accomplished, at least for evaporated milk or milk that has been boiled at least 15 minutes. For infants sensitive to cows' milk the use of goats' milk is frequently satisfactory. This can be obtained in cans. A milk substitute for allergic infants is also prepared from soy beans and sold as Sobee.

A diet which is frequently needed is the wheat-, milk-, and egg-free diet. For this special menus and recipes are needed. Whole rye wafers are made of whole rye, water and salt and may be safely used in such diets. Crumbs of rye wafers can be used in such dishes as stuffed or scalloped tomatoes or apple betty. Rice flour and cornmeal are useful in muffins and rye and rice flours can be combined in a bread raised with baking powder.[1]

Food in Fevers

In the early stages of fever, digestion is often much disturbed—sometimes to such a degree that no food at all can be retained. No food should be given which cannot be readily digested and absorbed, for undigested food will do more harm than good. A liberal supply of liquid is important to relieve thirst and help in elimination of waste products, but when the digestive tract is very irritable even fluids will have to be given in small quantities at a time, though at frequent intervals. For a few days after the first onset of fever, the beverages, aside from water, may be confined principally to milk, buttermilk, fruit juices and vegex broth.

But the energy output in fever is higher than when the body is free from fever and increases with each degree of rise in temperature. Hence the higher the temperature the greater the need for food. To an energy allowance suitable for a healthy man lying in bed there must be added allowances for the rise in temperature,

[1] Many helpful suggestions will be found in *You Can't Eat That*, Morgan, H., Harcourt, Brace and Company (1939), and *Egg, Wheat and Milk-free Diets*, Balyeat, R. M., Busten, E. M., and Bowen, R., J. B. Lippincott Company (1933).

restlessness, and perhaps also a special toxic destruction of protein due to the infection. As a result, the total energy requirement in fever may be 30, 40, or 50 per cent higher than normal, so that the bedridden man, instead of requiring from 1800 to 2200 calories per day will need as much as if he were doing fairly active muscular work in health, *i.e.*, 2800 to 3000 calories. In certain instances, notably in typhoid fever, even this liberal number of calories may not be sufficient to keep the body from great loss of nitrogen. Such loss cannot be prevented by increasing the protein of the diet, however, but only by raising the calories to perhaps 4000 or 5000 per day. The protein requirement in fever is not higher than normal and will be met by from two to two and one-half calories per pound of body weight.

The increase in the energy requirement necessitates a corresponding increase in vitamin B_1; and the losses of vitamins A and C caused by infection call for very liberal supplies of both. The use of milk, cream, eggs, and fruit juices as the main sources of the calories insures a diet fairly liberal in all three vitamins, but when the patient is not able to take a high calorie diet it may be advisable to add suitable amounts of pure vitamin C (ascorbic acid) and to give a halibut liver oil capsule or some other concentrated source of vitamin A.

The administration of food in fever calls for the exercise of skill and good judgment in deciding how far the patient's energy needs can be met when the alimentary tract is very sensitive (since indigestion may be worse than under-feeding) and in selecting the food which can be taken most successfully. A fluid diet is safest and easiest to give, as a rule. Meals may be served at intervals of two hours. Milk is an ideal fever food, if modified to suit the digestive state of the patient. Whole cow's milk is so high in protein that it will make a better balanced diet if something containing little or no protein is combined with it—cream or milk sugar or both, or some cereal gruel. The after-taste of milk is disagreeable to many, especially when the mouth is parched with fever, and this can be avoided by carefully cleansing the mouth with water, plain or slightly acidified with lemon juice, immediately after each feeding. The outline of a fluid diet on page 296 may be

A MODERATELY PRICED DIETARY FOR CONVALESCENCE FROM FEVER

	Measure	Weight Oz.	Protein Calories	Total Calories
7 A.M.:				
Orange juice (C, B_1, A)	¾ cup	6.4	—	100
Lactose	4 tsp	0.4	—	40
				140
BREAKFAST, 8 A.M.:				
Egg (A, B_1, G)	1 egg	1.6	25	70
Toast	1 slice	0.7	7	50
Butter (A)	1 tsp	0.2	—	33
Wheat flakes[1] (B_1)	⅔ cup	1.0	13	100
Top milk for cereal (A, G)	½ cup	3.6	5	100
Milk to drink (A, B_1, G)	1 cup	8.5	34	170
				523
10 A.M.:				
Prune juice	¾ cup	6.0	—	100
Lemon juice (C)	1 tbsp	0.5	—	5
Lactose	1 tbsp	0.3	—	40
				145
DINNER, 12:30 P.M.:				
Baked potato (C, B_1)	1 small	1.5	5	50
Pea purée (A, B_1, C, G)	¼ cup	1.3	9	50
Toast	1 slice	0.7	7	50
Butter (A)	2 tsp	0.4	—	66
Custard with lactose (A, B_1, G)	⅔ cup	4.0	34	250
Coffee, half milk (A, B_1, G)	1 cup	8.5	17	85
Cream (A)	2 tbsp	1.2	2	53
Sugar	1 tsp	0.1	—	16
				620
3:30 P.M.:				
Orange juice (C, B_1, A)	¾ cup	6.4	—	100
Lactose	4 tsp	0.4	—	40
				140
SUPPER, 6 P.M.:				
Scrambled egg (A, B_1, G)	¼ cup	2.1	25	100
Mashed potato (C, B_1)	¼ cup	0.8	5	50
Spinach à la crême (A, B_1, G)	¼ cup	1.7	5	40
Toast	1 slice	0.7	7	50
Butter (A)	2 tsp	0.4	—	66
Apple sauce	⅜ cup	3.5	2	100
Milk to drink (A, B_1, G)	1 cup	8.5	34	170
				576
9 P.M.:				
Milk (A, B_1, G)	1 cup	8.5	34	170
Total for day				2314

[1] Ready-to-eat, with added vitamin B_1.

used in fever as soon as the digestive tract will tolerate it—usually in a few days.

A fever patient is not limited very long to a fluid diet, though solid foods must be given cautiously and introduced gradually. The foods from which the diet should be chosen are:

1. Milk in various forms
2. Mild fruit juices, to which lactose may be added for extra calories
3. Cream soups—potato, pea, tomato, spinach, carefully strained and thickened with flour
4. Gruels—always strained, with added vitamin B_1 as vegex or as pure crystalline thiamin
5. Eggs, raw or soft-cooked
6. Cream and butter
7. Custards, ice creams and sherbets, blanc manges, and gelatin jellies. Milk sugar used for sweetening will increase the fuel value
8. Toast
9. Breakfast cereals, thoroughly cooked and strained
10. Rice, baked and mashed potatoes

Such a diet is adapted to the early stages of convalescence, and may even be prescribed during the later stages of fever. A plan for a very simple, easily digested, mixed diet, free from anything likely to cause intestinal irritation or other disturbance, is shown above. It will yield 2314 calories, and is ample in proteins, minerals and vitamins.

Diet in Tuberculosis

When the tubercle bacillus gains a foothold in the human body, it not only proceeds to invade the organ upon which it encamps,—lungs, kidney, or whatever it may be—but it produces poisons which permeate the whole system, causing fever, loss of appetite, and other bad conditions which result in the wasting so familiar in this dread disease. There is no known drug which will kill or drive out the germ; the body must elaborate its own weapons of defense, and the object of treatment is to build the person up so that resistance to the disease will become great enough to bring about a cure. Everything which will help to promote good nutrition must be emphasized—all the fresh air obtainable, carefully regulated rest and exercise, and good food in abundance.

The appetite is apt to be poor and fitful and no guide whatever as to how much the patient should eat. Often he must continue eating when he does not want food at all. This does not mean that he should be indiscriminately "stuffed." In the past this has often been done to the detriment of the patient through upsetting his digestion and otherwise overtaxing his system. Laboratory studies of the energy expenditure in tuberculosis, together with the carefully recorded observations of sanitaria, indicate that the energy requirement is not raised greatly above the normal in this disease, and it has been suggested that in pulmonary tuberculosis excessive food intake, bringing about a production of extra heat by its stimulating effect upon the body, may do harm to the lungs by increasing their work, especially in the active stages of the disease. The total energy value of the diet must therefore be adapted to the individual patient, and should be just sufficient to maintain a body weight slightly above normal. In general, diets range between 2500 and 3500 calories, according to whether the patient is permitted to engage in physical activity or not.

In selecting foods to make a liberal but not excessive diet, the generous use of fat is very desirable, as it is burned with less tax on the lungs than carbohydrate or protein. Laboratory experiments show that from 240 to 360 protein calories per day are sufficient for patients having enough total calories to meet their energy requirements. In other words, the *proportion* of protein in the diet should not be higher than a liberal normal value—from 12 to 15 per cent of the total calories.

In addition to fulfilling protein and energy requirements quantitatively, it is important that the protein be of good quality and that the minerals and vitamins be liberally supplied.

The full amount of a well-balanced diet, arranged with regard to the state of appetite and digestion of the patient, must be taken with as complete regularity as possible. Each day's food should be measured, at least roughly, and by cheerful encouragement, mild diversion, carefully cooked and attractively arranged meals, its consumption secured. Three regular meals a day are sufficient with moderate energy intake, an extra glass of milk or two being sometimes prescribed. The weight should be watched

and if it goes down, the diet should be altered accordingly. Constipation is common, hence a gently laxative diet is desirable. In case of serious gastric disturbance readjustment of the diet should be made under the physician's guidance.

The general plan for a convalescent diet on page 305 can be used as a guide in planning a diet for tuberculosis, especially where there is chronic fever and the patient is confined to his bed. If over 2500 calories are required, the additional allowance should be in the form of butter or cream rather than lactose or other carbohydrate food. Since the need for vitamin C is increased in tuberculosis, the amount should be increased or else there should be some addition of the vitamin in pure form. When fresh oranges are difficult to obtain or very expensive, an excellent substitute is a preparation of dried orange juice and sugar with added vitamin C which can be made into a beverage with water or with any available fruit juice, such as prune juice or apple juice.

For ambulatory patients a larger calorie allowance is necessitated by their greater activity, and since tuberculosis is a chronic disease, the question of cost is of more than passing importance. The two dietaries which follow are designed to show what can be done for the person whose food budget is limited. The second is more restricted in cost than the first, and lower than this it is very difficult to go except by substituting evaporated milk for fresh. The use of the meat fat instead of butter, while giving flavor, reduces somewhat the amount of vitamin A and the regular use of a small amount of cod liver oil or some other concentrated source of vitamin A is highly desirable.

Diet in Diabetes

Diabetes mellitus is a disease in which the most striking symptom is an impairment of the power of the body to utilize carbohydrates. These ordinarily circulate in the blood as sugar and are burned by the muscles for fuel or stored in muscles and liver as glycogen for future use. In the diabetic the sugar in the blood cannot be burned and accumulates in the blood until a certain point is reached, when it passes into the urine. Not every one who excretes sugar is a diabetic, but the appearance of sugar in the

A Moderately-Priced Dietary for Tuberculosis

	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Orange juice (C, B_1, A)	¾ cup	6.4	—	100
Dark farina with added wheat germ (B_1)	½ cup	0.8	8	75
Cream, thin (A)	½ cup	3.6	10	200
Poached egg (A, B_1, G)	1 egg	1.6	25	70
Toast	2 slices	1.3	14	100
Butter (A)	1 tbsp	0.5	1	100
Sugar	2 tbsp	1.0	—	100
Milk (A, B_1, G)	1 cup	8.5	34	170
Coffee	—	—	—	—
				915
Dinner:				
Roast beef (G)	2 slices	3.2	92	200
Gravy	¼ cup	1.7	7	50
Mashed potato (C, B_1)	¾ cup	4.7	11	150
Buttered peas (A, B_1, C, G)	½ cup	2.7	18	100
Bread, whole wheat (B_1)	1½ slices, 3 in. x 3¾ in. x ¼ in.	0.7	7	50
Butter (A)	1 tbsp	0.5	1	100
Apple tapioca (B_1, C)	½ cup	3.6	2	100
Cream (A)	¼ cup	1.8	5	110
Milk (A, B_1, G)	1 cup	8.5	34	170
				1030
Supper:				
Cream of celery soup (B_1, A)	¾ cup	5.4	17	150
Baked sweet potato (A, B_1, C)	1 small	4.5	9	150
Bread	1 slice	0.7	7	50
Butter (A)	2 tbsp	1.0	2	200
Stewed pears (B_1)	¾ cup	5.5	4	150
Milk to drink (A, B_1, G)	1 cup	8.5	34	170
				870
Total for day			342	2815

A Low-Priced Tuberculosis Dietary for a Working Man

	Measure	Weight Oz.	Protein Calories	Total Calories
Breakfast:				
Apple sauce (B_1, C)	⅜ cup	3.5	1	100
Oatmeal with added wheat germ (B_1)	¾ cup	6.0	17	100
Bacon, broiled	5 large pieces	1.0	26	200
Bacon fat	1 tbsp.	0.5	—	100
Bread, whole wheat (B_1)	3 slices, 3 in. x 3¾ in. x ½ in.	2.8	32	200
Sugar	2 tbsp. (scant)	0.9	—	100
Milk (A, B_1, G)	1 cup	8.5	34	170
Coffee	—	—	—	—
				970
Dinner:				
Beef stew with vegetables (B_1, C, A, G)	⅘ cup	6.0	32	200
Boiled potato (C, B_1)	1 large	5.4	16	150
Bread, whole wheat (B_1)	1½ slices, 3 in. x 3¾ in. x ½ in.	1.4	16	100
Butter (A)	1 tbsp.	0.5	1	100
Tapioca-cornmeal pudding (A, B_1, G)	½ cup	3.6	22	200
Sugar	1 tbsp.	0.5	—	53
Milk (A, B_1, G)	1 cup	8.5	34	170
Coffee	—	—	—	—
				973
Supper:				
Pea soup I[1]	1 cup	7.9	43	167
Sausages (G)	2 small	2.2	40	200
Stewed tomatoes (C, A, B_1, G)	¾ cup	6.4	9	75
Bread, whole wheat (B_1)	1½ slices, 3 in. x 3¾ in. x ½ in.	1.4	16	100
Sausage fat	1 tbsp.	0.5	—	100
Cheese, American (A, B_1)	⅝ in. cube	0.4	13	50
Stewed apricots (A)	⅓ cup	3.4	5	125
Milk (A, B_1, G)	1 cup	8.5	34	170
				987
Night Lunch:				
Bread, whole wheat (B_1)	1½ slices	1.4	16	100
Butter (A)	1 tbsp.	0.5	1	100
Milk (A, B_1, G)	1 cup	8.5	34	170
				370
Total for day			442	3300

[1]See Table II, Appendix.

urine should be regarded with suspicion and the state of health thoroughly investigated, for the sooner this disease is treated the better the chance of arresting its progress and keeping the patient in comparatively good health and comfort. The presence of excessive sugar in the blood lowers resistance to bacterial infection and invites numerous complications, besides hastening the progress of the disease itself—that is, the disturbance of the sugar-burning power of the body. Middle-aged and elderly people ought to have their urine tested once a year as a precautionary measure.

The fundamental cause of this disease is the failure of the pancreas to produce a sufficient amount of a substance known as insulin, which, circulating in the body, enables it to burn sugar. While it has been known for a long time that the pancreas was at fault, it was not until 1921 that a way was found by Dr. Banting, at the University of Toronto, to make from the pancreas of another species a preparation of insulin which could be administered to a man and thus supply what his own damaged gland could not furnish. This discovery marks a new era in the history of diabetes mellitus. Where formerly a severe case required the most restricted diet, with the patient forced to live in a state of emaciation and weakness which made him a hopeless invalid, today suitable treatment with insulin makes possible a diet which, though still restricted to a specified regimen, may be excellent in quality and sufficient in quantity to enable the person to maintain practically normal weight and to go about his affairs without undue hunger or great weakness.

Insulin cannot be given by mouth because it is destroyed in the alimentary tract, and must be administered subcutaneously with a hypodermic needle. The dosage is in units each one of which will enable the patient to utilize one or two grams more of carbohydrate than he otherwise could. Enough may be administered per day to increase materially the amount of carbohydrate which can be allowed, not only making the diet more palatable, but also enabling the body to burn protein and fat better. Careful treatment and strict adherence to diet does away almost entirely with the dreaded acidosis which menaced the life of the diabetic before

insulin was available, and greatly reduces the susceptibility to infection which was also formerly a constant danger. But treatment with insulin must be regulated by a competent physician, for it is a powerful drug, and if not used according to exact directions may go too far toward driving sugar out of the circulation and give the patient an attack of hypoglycemia, which has very uncomfortable and dangerous symptoms. Fortunately these can be relieved by swift administration of carbohydrate, and patients taking insulin are advised to have a small stock of carbohydrate (as a lump of sugar or an orange) by them for such an emergency.

Under proper instruction, the diabetic can learn to administer insulin to himself, and can continue to do so over long periods if he implicitly obeys instructions about dosage and diet. For the discovery of insulin has not done away with the necessity for strict measurement of all food eaten, but has greatly emphasized the importance of it. When insulin is taken there must be also taken, at the right moment by the clock, just the amount of carbohydrate which the insulin can take care of, plus whatever the impaired pancreas is also able to care for. There must also be a definite relationship between the amount of carbohydrate and the amount of protein and fat in the diet, because protein is capable of yielding 58 per cent of its weight in glucose and fat about 10 per cent. In prescribing the carbohydrate allowance of any patient, these sources of sugar must be taken into account. Furthermore, the amount of fat which can be burned depends quite definitely upon the amount of sugar which can be burned, hence in modern diabetic dietaries all three fuel foodstuffs are very carefully prescribed, and too much protein or fat is just as undesirable as too much carbohydrate.

While certain general principles in regard to dietetic treatment can be stated, each patient presents an individual problem which must be studied not only at the beginning, but throughout the whole life of the individual. The power to burn sugar, once lost, is usually not fully regained, though in the course of time there may be distinct improvement. The diet must always be restricted, although it may be improved from time to time if the patient is coöperative and follows instructions.

In order to find out the exact capacity of any patient to burn sugar, a series of tests is usually made, preferably in a hospital, before insulin treatment is established. By careful supervision of the patient and periodic examinations of blood and urine the physician will determine the amounts of protein, fat, and carbohydrate which may be taken with a given dosage of insulin. Then the patient must learn how to select his diet in harmony with these directions unless he be rich enough to command the services of a trained dietitian. Given a specific prescription for a diet the patient who has not studied food values feels quite at a loss as to how to proceed. But he can soon learn to use tables which give the amount of each of these nutrients in *grams*. The prescription must be scrupulously followed in every detail. A good scale is necessary, weighing preferably in grams.[1] Standard halt-pint measuring cups, one divided into quarters, the other into thirds, and a standard tablespoon and teaspoon are aids to accuracy.

In order that a diet of low fuel value may have sufficient bulk to satisfy the appetite, liberal use is made of the more watery and fibrous vegetables which contain less than ten per cent of carbohydrate and may be eaten in considerable quantities without increasing markedly the total carbohydrate of the ration. Vege-

VEGETABLES GROUPED ACCORDING TO CARBOHYDRATE CONTENT

3 PER CENT	6 PER CENT	9 PER CENT
Asparagus	Collards	Brussels sprouts
Beet greens	Beets	Carrots
Broccoli	Dandelion greens	Onions
Cabbage	Egg plant	Peas, very young
Celery	Green peppers	Rutabagas
Cucumbers	Kale	
Lettuce	Kohlrabi	
Mustard greens	Squash	
Sauerkraut	Turnips	
Spinach		
String beans		
Tomatoes		
Turnip tops		
Watercress		

[1] Such scales can be secured from the Chicago Dietetic Supply House, Chicago, Illinois, or John Chatillon Sons, New York Citv.

tables having the same per cent of carbohydrate may be used interchangeably and thus the patient can make adaptations to his own circumstances. Lists such as the preceding are helpful in making suitable selections, and can be extended to all sorts of food.

Tables giving the weights of portions of food to yield a certain number of grams of protein or carbohydrate are also useful and can be arranged from a standard handbook of food values[1] with little trouble. Thus one may obtain 10 grams of carbohydrate from any one of the following portions of fresh fruits:

Grapefruit	150 grams
Watermelon	110 grams
Strawberries	135 grams
Peaches	130 grams
Orange juice	80 grams
Malaga grapes	70 grams

Making a diabetic diet acceptable depends not only upon ability to regulate the kind and amount of food, but upon skill in cookery, and the amount of money available for food. Since carbohydrates constitute the largest part of an ordinary diet, their partial withdrawal changes eating habits materially, and people find it difficult to do without the familiar bread, potatoes, cereals, sugars, and fruits. Furthermore, the carbohydrate foods are relatively the cheapest part of the diet, so that a diabetic diet will always cost more than an ordinary diet of the same general character. Most books on invalid cookery give recipes for diabetic diets. These are very helpful because the cook is deprived of her ordinary thickening agents, such as flour, also of sugar and milk, and special devices are necessary to make acceptable dishes. The best success in feeding comes from judicious use of the ordinary foods in correct amounts, depending chiefly upon vegetables of low carbohydrate content to furnish a good share of each day's carbohydrate allowance. Special diabetic foods on the market are expensive and usually less desirable than natural foods. The strict

[1] Such as Rose's *Laboratory Handbook for Dietetics*, 4th Ed., The Macmillan Company (1937). Small books with many practical suggestions regarding diet are Huddleson's *Food for the Diabetic*, The Macmillan Company (1934), and Joslin's *Diabetic Manual*, Lea and Febiger (1937). For practical suggestions and recipes see also Pattee's *Practical Dietetics*, A. F. Pattee, (1938).

limitation of protein makes the use of gluten, soy bean flour and the like quite impractical. Both vegetables and fruits are now canned for the diabetic without sugar, and may be obtained from supply houses making a specialty of diabetic foods. They add materially to the variety possible, especially in the winter.

Saccharine may be used for sweetening in place of sugar. It has no food value, but is intensely sweet, having 500 times the sweetness of cane sugar. The taste remains in the mouth much longer than that of sugar, and if much is used a bitter taste develops. It should, therefore, be used with great moderation to get the best results in the long run.

There is always danger of mild diabetes becoming severe; the only way to prevent this is by eternal vigilance in regard to diet, and careful living, without physical overwork or nervous strain. Even when the patient is tempted by long periods of continued well-being to disregard his dietetic limitations, he should be prevented from doing so. A diabetic patient should not have charge of his own diet if it can possibly be avoided. The unhappy feeling of restriction will be less and the temptation to overstep the boundaries diminished if some one else plans and prepares the meals.

In the home, the problem of following the doctor's orders is often difficult because of expense. Breadstuffs and other cereal foods constitute so large a part of the very low-priced dietary, that a change to one in which vegetables of very low carbohydrate content are an important part of at least two meals a day, if not all three, is one which seems at first rather difficult. But from the point of view of general nutrition, the modern diabetic diet is better than most ordinary diets, because of its greater richness in mineral and vitamins, its laxative properties and its unfailing regularity of meals.

In planning the menu, it is best to divide the day's allowance of protein, fat, and carbohydrate fairly evenly among the three meals. Unless the carbohydrate allowance is extremely low, a small portion of fruit can usually be allowed for breakfast. When more than 50 grams of carbohydrate are permitted for the day, a small portion of breakfast cereal may also be given. Heavy cream

(40%) is very low indeed in protein and carbohydrate, and small weighed portions can be diluted a little with water to take the place of milk.

For the other two meals, there should generally be three or four vegetables; one served raw for a salad, as cabbage or lettuce, having about 3 per cent of carbohydrate; two cooked and made the carriers of butter or other fat allotted to the meal, one of these in the "3 or 6 per cent" class and the other in the "9 per cent" class. This plan helps to insure variety without violation of regularity in the amount of carbohydrate eaten. A small portion of potato is desirable if it can be added without exceeding the allowance.

For breakfast an egg is usually possible, and for each of the other meals a small portion of meat.

Desserts make the menu seem less restricted, but must be made without sugar, using saccharine to sweeten. Gelatin is very useful, as so small a quantity makes a portion of jelly, and a great variety of flavors is possible, but if the protein is greatly restricted, "vegetable gelatin" or agar-agar, which has practically no protein, may be substituted. Heavy cream is also very useful in making various whipped cream desserts, to which small amounts of fruit or fruit juice can by careful figuring be added. When the carbohydrate allowance is 60 grams or more, a daily portion of bread at one meal will be greatly appreciated by most people. Some examples of diabetic dietaries at moderate cost are included here, to show what may be done, in spite of restrictions, to make wholesome and palatable meals. To correspond with the tables in the Appendix and with other dietaries in this book, food values have been worked out in calories instead of grams, but to convert them into grams it is, of course, only necessary to divide protein and carbohydrate calories by 4 and fat calories by 9. Weights have been given in ounces for the same reason, but it is more accurate, and therefore preferable, to weigh foods in grams for all diabetics. Upon the care with which the diet is controlled, not only the present, but also the future welfare of the diabetic very largely depends. With the help of insulin, such good diets are now possible that the diabetic can truly be a well-nourished person so long as he adheres strictly to his prescribed routine.

A Moderately-Priced Dietary for a Diabetic, I

Daily allowance: Protein, 64 grams or 256 calories
Fat, 126 grams or 1134 calories
Carbohydrate, 103 grams or 412 calories
Total calories, 1799

	Measure	Weight Oz.	Protein Calories	Fat Calories	Carbohydrate Calories	Total Calories
Breakfast:						
Orange	1 small	4.8	4	1	45	50
Cornflakes	¼ cup	0.3	2	1	30	33
Bran, prepared	¼ cup	0.6	8	4	13	25
Wheat germ, flaked	¼ cup	0.5	16	15	29	60
Butter	½ tbsp	0.3	—	50	—	50
Egg	1 egg	1.9	25	45	—	70
Cream, for cereal and coffee, 18.5%	¼ cup	1.9	6	90	10	106
Milk	¼ cup	2.1	8	22	12	42
			69	228	139	436
Luncheon:						
Beef loaf	1 slice	1.4	40	60	—	100
Bread, whole wheat	1 slice	0.7	7	1	42	50
String beans, steamed	½ cup	1.7	6	1	18	25
Butter for bread and vegetables	2½ tbsp	1.3	—	250	—	250
Milk	½ cup	—	17	44	24	85
Lettuce	ad libitum	—	—	—	—	—
French dressing	1½ tbsp	—	—	100	—	100
Pineapple, canned[1]	1 slice and juice	4.0	1	1	48	50
			71	457	132	660
Dinner:						
Roast veal	1 slice	2.0	65	25	—	90
Carrots, diced	⅜ cup	1.9	3	2	20	25
Celery, stewed	1 cup	4.5	6	1	17	24
Potato, baked	1 small	2.1	8	1	62	70
Butter for vegetables	2½ tbsp	1.3	—	250	—	250
Salad {cabbage, pepper, lettuce}	1 cup	2.8	4	—	19	24
French dressing	1½ tbsp	0.6	—	100	—	100
Custard, baked[2]	¾ cup	5.0	30	66	24	120
			116	445	142	703
Total for day: Calories			256	1130	413	1799
Grams			64	126	103	

[1] Canned without sugar and sweetened with saccharine.

[2] ½ egg, ½ cup milk, saccharine, nutmeg.

A Moderately-Priced Dietary for a Diabetic, II

Daily allowance: Protein, 70 grams or 280 calories
Fat, 168 grams or 1512 calories
Carbohydrate, 148 grams or 592 calories
Total calories, 2386

	Measure	Weight Oz.	Protein Calories	Fat Calories	Carbohydrate Calories	Total Calories
Breakfast:						
Orange juice	⅜ cup	3.2	2	—	48	50
Rolled oats, cooked	⅜ cup	2.4	8	8	34	50
Wheat germ, granular	¼ cup	0.9	27	25	48	100
Egg	1 egg	1.9	25	45	—	70
Bacon	3 small slices	0.4	10	65	—	75
Toast, whole wheat	1 slice	0.7	7	1	42	50
Butter	½ tbsp	0.3	—	50	—	50
Cream, for cereal and coffee, 18.5%	¼ cup	1.9	6	90	10	106
Milk	¼ cup	2.1	8	22	12	42
Coffee	—	—	—	—	—	—
			93	306	194	593
Luncheon:						
Boiled ham, fat	1 slice	1.3	20	80	—	100
Tomato, stewed	⅔ cup	5.7	8	3	22	33
Potato, boiled	1 small	3.3	9	1	70	80
Lettuce	ad libitum	—	—	—	—	—
Mayonnaise	1⅓ tbsp	0.7	1	132	—	133
Bread	1 slice	0.7	7	1	42	50
Butter for bread and vegetables	3 tbsp	1.5	—	300	—	300
Cherries (Queen Anne)[1]	6 cherries and juice	2.0	2	3	28	33
Milk	¾ cup	6.4	24	66	37	127
			·71	586	199	856
Dinner:						
Pot roast of beef	1 slice	1.6	62	38	—	100
Spinach, cooked	½ cup	3.7	2	1	17	20
Onions, boiled	2 small	3.5	6	3	41	50
Potato, baked	1 small	2.1	8	—	62	70
Butter for vegetables	3 tbsp	1.5	—	300	—	300
Salad { grapefruit	3 sections	1.0	1	—	14	15
Salad { lettuce	ad libitum	—	—	—	—	—
French dressing	1 tbsp	0.4	—	67	—	67
Pumpkin pie, crust	⅛ pie crust	0.4	3	29	18	50
Filling[2]	¾ cup	7.2	32	68	45	145
Cream, 40%	2 tbsp	1.2	2	114	4	120
			116	620	201	937
Total for day: Calories			280	1512	594	2386
Grams			70	168	149	

[1] Canned without sugar and sweetened with saccharine.

[2] ⅓ cup pumpkin, ½ egg, ½ cup milk, saccharine and seasoning.

APPENDIX

TABLE I

Nutritive Values of Foods

INTRODUCTORY NOTE

Most of these foods have been measured and weighed in the author's laboratory, some of them many times. Nevertheless, standardization of measures and weights is exceedingly difficult, and these tables make no claim to strict mathematical accuracy. They are presented with the hope of enabling the housewife who does not wish the burden of weighing and making calculations—or the persons who cannot go behind the scenes, *i.e.* into the kitchen—to get quickly some fair conception of the relative value of various foods as they appear on the table. Many of the data have been taken from the author's *Laboratory Handbook for Dietetics*, 4th edition (1937). Weights and measures are for foods as we eat them unless otherwise stated. Recipes for many of the made dishes will be found in Table II of this Appendix. Vitamin values for vitamins A, B_1 and C are given in international units (I. U.) and for vitamin G in Sherman-Bourquin units (S. U.). Wherever losses of vitamins B_1 and C in cooking are known, suitable deductions from the raw values have been made. Where the vitamin values have not been determined so that they can be stated in units, one plus sign has been used to designate a fair amount and two pluses to indicate that the food may be considered a good source.

Table I.—Nutritive Values of Foods

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Almonds, chopped	1 cup	3.0	550	18.1	.220	.390	.0336	+	36	–	+
Almonds, salted	10–12 nuts	0.5	100	3.0	.036	.060	.0055	+	+	–	+
Almonds, shelled	12–15 nuts	0.6	100	3.3	.040	.071	.0061	+	7	–	+
Almonds, shelled	1 cup	4.0	725	23.8	.281	.515	.0444	+	47	–	+
Almonds, sugar	1 almond	0.3	40					+	+	–	+
Angel cake	Piece 1¼" x 2" x 2½"	1.3	100	3.0	–	.009	–	–	–	–	360
Apple and carrot salad	1 serving[1]	2.9	100	0.6	.022	.029	.0004	977	15	60	28
Apple, baked with 2 tbsp. sugar	1 large apple	4.6	200	0.6	.013	.020	.0006	89	10	16	32
Apple, baked with whipped cream	1 apple	4.8	200	0.9	.024	.029	.0006	243	10	16	32
Apple, fresh, whole	1 large	7.5	100	0.6	.013	.020	.0006	89	20	160	32
Apple, fresh, whole	1 medium	6.0	80	0.5	.010	.016	.0005	70	16	128	26
Apple pie	Piece 1½" at circumference[2]	1.6	100	1.0	.005	.011	.0001	19	4	3	6
Apple pie	Piece 4½" at circumference[2]	4.8	300	3.2	.015	.035	.0003	57	12	9	18
Apple sauce	⅜ cup	3.5	100	0.4	.008	.012	.0003	53	6	10	19
Apple sauce cake	Piece 1½" x ½" x 3¾"	0.8	100	1.1	.003	.012	–	40	–	–	4
Apple snow	⅘ cup	2.0	100	1.6	.006	.009	.0002	38	4	6	24
Apple snow	1 cup	2.7	132	2.1	.008	.012	.0003	48	5	8	32
Apple tapioca	½ cup	3.6	100	0.1	.004	.005	.0003	18	2	3	6
Apple tapioca	2 cups	14.8	407	0.4	.016	.020	.0010	72	8	12	24
Apricots, canned	3 large halves and 2 tbsp. juice	4.8	100	1.3	.014	.026	.0005	++	+	+	+
Apricots, dried	9 halves	1.3	100	1.7	.023	.043	.0027	1890	+	140	34
Apricots, dried, stewed, sweetened	¼ cup	2.7	100	1.0	.014	.026	.0016	1144	+	40	20
Apricots, fresh, whole	5 apricots	6.5	100	1.8	.023	.042	.0011	7168	+	110	74
Asparagus au gratin	½ cup	3.0	100	4.8	.113	110	.0012	745		–	+

[1] For serving consult Table II, Dietary Recipes.
[2] All pies are 9 inches in diameter.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	B1 I. U.	C I. U.	G S. U.
Asparagus, canned, drained	15 large stalks 5½" long	12.0	100	9.3	.040	.075	.0019	2000		230	
Asparagus, canned tips, drained	1 cup	6.0	50	4.7	.020	.038	.0009	1000		115	
Asparagus, creamed	¼ cup	2.5	100	4.3	.079	.090	.0012	780	3	140	15
Asparagus, fresh, cooked	20 large stalks 7½" long	13.5	100	8.4	.080	.149	.0038	2000	++	460	++
Asparagus on toast	⅗ serving[1]	4.6	100	3.7	.066	.071	.0007	365	2	63	27
Asparagus on toast	1 serving[1]	7.7	169	6.3	.112	.120	.0011	620	4	107	45
Asparagus soup, cream of	½ cup (scant)	4.0	100	4.0	.089	.093	.0008	501	6	60	30
Avocado (West Indian)	1 whole	8.2	205	2.2	.155	.103	.0132	720	97	340	107
Avocado dessert	¼ cup cubes	1.6	100	0.6	.044	.028	.0037	201	27	91	30
Avocado on the half shell	¼ medium pear	1.1	100	1.0	.070	.046	.0059	324	43	147	48
Avocado salad	¼ cup cubes	1.8	100	1.0	.051	.042	.0044	267	38	132	44
Bacon, cooked	4-5 small slices	0.5	100	3.3	.002	.036	.0005	–		–	
Bacon fat	1 tbsp.	0.4	100	–	–	–	–	–	–	–	–
Baking powder biscuit	2 small biscuits	1.3	100	3.0	.023	.035	.0002	57	1	–	9
Banana and lettuce salad	1 serving[1]	1.8	33	0.4	.005	.010	.0002	52	10	142	12
Banana jelly	Piece 3" x 2" x 1"	3.8	100	2.2	.001	.005	.0001	27	2	48	5
Banana nut salad	⅓ serving[1]	1.7	100	1.2	.007	.026	.0002	50	11	40	11
Banana salad	1 small serving[1]	2.6	100	2.4	.017	.005	.0006	144	18	110	34
Banana in skin	1 medium	5.5	100	1.3	.008	.030	.0006	119	15	170	30
Barley flour	4 tbsp.	1.0	100	3.0							
Barley flour	1 cup	8.0	796	23.9							
Barley, pearl	1 tbsp.	0.5	50	1.4	.003	.025	.0003	–	–	–	–
Barley, pearl	1 cup	7.5	755	18.0	.045	.386	.0042	–	–	–	–
Beans, baked, canned	⅓ cup	2.7	100	5.4	.045	.134	.0029	12	35	–	+
Beans, baked, cream soup	½ cup	4.0	100	4.1	.055	.100	.0015	277	22	91	13
Beans, kidney stew	½ cup	4.9	100	4.0	.030	.101	.0016	345	14	350	15
Beans, Lima, dried	⅙ cup	1.0	100	5.2	.020	.110	.0025	+	47	–	90

[1] For servings consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Beans, Lima, dried	1 cup	5.5	546	28.6	.109	.546	.0134	+	257	–	492
Beans, Lima, dried, baked	⅓ cup	2.4	100	3.5	.016	.077	.0014	144	23	–	62
Beans, Lima, dried, stewed	⅓ cup	2.6	100	5.2	.020	.110	.0025	+	23	–	90
Beans, Lima, fresh, cooked	½ cup	2.9	100	5.9	.023	.108	.0020	+	46	240	81
Beans, Lima, fresh, buttered	¼ cup	1.7	100	3.0	.011	.054	.0020	96	22	120	40
Beans, navy, dried	⅛ cup (scant)	1.0	100	6.5	.043	.134	.0029	10	37	–	+
Beans, navy dried	1 cup	7.0	684	44.6	.294	.915	.0199	75	256	–	+
Beans, soy, see Soy beans											
Beans, string, cooked	2⅓ cups of 1″ pieces	8.5	100	5.5	.133	.123	.0028	1808	30	220	60
Beans, string, buttered	1⅙ cup	5.0	100	2.8	.069	.063	.0014	1097	15	110	30
Beans, string, buttered	1 cup	4.3	86	2.4	.058	.054	.0012	942	13	95	26
Beans, string, creamed	½ cup	3.5	100	3.2	.088	.076	.0007	618	9	58	29
Beef broth	4 cups	32.0	150	16.5	–	–	–	–	–	–	–
Beef, corned, boiled (less ¾ fat content)	Slice 4″ x 1½″ x ⅚″	3.0	100	13.2	.008	.142	.0020	+	+	–	++
Beef, corned, boiled (with fat)	Slice 4½″ x 1½″ x ¼″	1.0	100	5.2	.003	.056	.0008	+	+	–	++
Beef, dried	4 thin slices 4″ x 5″	2.0	100	15.7	.009	.169	.0024	+	+	–	++
Beef, dried, creamed I	⅓ cup (scant)	2.4	100	3.1	.044	.054	.0003	57	8	8	38
Beef, dried, creamed II	⅓ cup	2.3	100	4.9	.059	.084	.0006	175	14	11	69
Beef, drippings	1 tbsp.	0.4	100	–	–	–	–	–	–	–	–
Beef, Hamburg steak, broiled	Cake 2½″ dia. ⅞″ thick	2.0	100	13.8	.008	.149	.0021	30	12	–	64
Beef, Hamburg steak with gravy	⅔ cake, 2″ diam., ¾″ thick, 1⅓ tbsp. gravy	2.2	100	9.5	.007	.101	.0011	87	+	–	43
Beef, heart, stuffed	Slice 2½″ x 2¼″ x ¼″	1.0	100	7.0	.005	.076	.0010	+	+	–	+
Beef, lean meat, uncooked	Slice 2¾″ x 1½″ x 1¾″	2.3	100	13.8	.008	.149	.0021	30	16	–	64
Beef liver, broiled, ground	½ cup	2.1	100	15.8	.009	.286	.0064	5670	39	–	694

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Beef liver, raw	Slice 4″ x 3″ x ½″	2.7	100	15.8	.009	.286	.0064	5670	39	+	694
Beef loaf	Slice 4″ x 6″ x ⅛″	1.4	100	11.7	.009	.114	.0017	104	12	–	57
Beef marrow	1 tbsp.	0.5	119	0.3	–	.003	–				
Beef pie	¼ serving[1]	1.7	100	4.6	.010	.054	.0007	225	9	27	24
Beef rib, lean, roasted	Slice 5″ x 2½″ x ¼″	1.6	100	11.5	.007	.124	.0017	+	12	–	+
Beef, round, lean	Slice 2¾″ x 1½″ x ¾″	2.3	100	13.6	.008	.130	.0019	30	16	–	64
Beef, round, lean, pot roast	Slice 4¾″ x 3½″ x ⅛″	1.6	100	15.4	.009	.166	.0023	+	8	–	64
Beef, round steak, pan-broiled	Slice 2″ x 3″ x ½″	2.0	100	12.0	.007	.129	.0018	+	8	–	64
Beef, round steak, stuffed	Slice 3″ diam. ⅜″ thick	1.7	100	9.8	.006	.093	.0013	21	9	–	43
Beef, round steak, Swiss style	Slice 4″ x 1″ x ⅝″	1.2	100	8.8	.006	.084	.0012	18	8	–	38
Beef, sirloin steak, lean, broiled	Slice 2″ x 1½″ x ¾″	2.0	100	11.8	.007	.127	.0018	+	8	–	64
Beef, sirloin steak, medium fat, broiled	Slice 1¾″ x 1½″ x ¾″	1.3	100	7.8	.005	.084	.0012	+	6	–	+
Beef stew with vegetables	⅖ cup	3.0	100	4.9	.013	.066	.0009	173	14	87	46
Beef stew with vegetables	1 cup	7.2	238	9.8	.031	.157	.0021	411	33	207	110
Beet greens, cooked	1⅓ cups	10.6	100	6.0	.284	.121	.0098	++	++		755
Beets, fresh, cooked	4 beets, 2″ diam. (1⅓ cups sliced)	7.7	100	3.5	.061	.093	.0019	29	8	140	109
Plackberries, fresh	1 cup	5.7	100	1.9	.052	.052	.0014	368	+	100	
Blackberries, stewed, sweetened	¼ cup	2.2	100	0.5	.013	.013	.0004	92	+	12	
Blueberries, see Huckleberries											
Blueberry pie	Piece 1⅓″ at circumference	1.4	100	0.9	.006	.011	.0002	24		15	1
Blueberry pie	Piece 4½″ at circumference	4.8	340	3.1	.020	.037	.0007	82		51	4

[1] For serving consult Table II, Dietary Recipe, Meat Pie.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

MATERIAL	MEASURE	WEIGHT OUNCES	TOTAL CALORIES	PROTEIN GRAMS	CALCIUM GRAMS	PHOSPHORUS GRAMS	IRON GRAMS	VITAMINS A I. U.	VITAMINS B_1 I. U.	VITAMINS C I. U.	VITAMINS G S. U.
Bluefish, broiled	Piece 3" x 2½" x 1"	3.3	100	18.0	.020	.206	.0010	–	+	–	+
Bologna sausage	Slice 2⅛" diam. ½" thick	1.5	100	8.0	.001	.026	.0012	+	+	–	+
Bouillon	4 cups	33.6	100	21.0	–	–	–	–	–	–	–
Bran, prepared	1 cup	2.3	100	8.7	.076	.582	.0111	–	52	–	+
Brazil nuts, shelled	2 nuts	0.5	100	2.4	.025	.085	.0004	+	+ +	–	
Bread, Boston brown	Slice 3" diam. ¾" thick	1.7	100	2.4	.057	.082	.0013	+	+	–	+
Bread crumbs, oven dried	1 cup	3.8	400	14.0	.040	.144	.0014	–	–	–	–
Bread crumbs, soft	1 cup	2.0	150	5.3	.015	.054	.0005	–	–	–	–
Bread crumbs, stale	1 cup	3.0	236	8.5	.026	.085	.0008	–	–	–	–
Bread, whole wheat, with milk	1⅓ slices 3¼" x 3" x ½"	1.2	100	3.9	.025	.068	.0006	3	54	–	14
Bread, whole wheat, with water	1½ slices 3¾" x 3" x ½"	1.4	100	4.0	.020	.062	.0007	+	61	–	+
Bread, old New England corn	Piece 2½" x 1" x 1"	1.0	100	2.0	.017	.028	.0004	63	6	–	4
Bread, rye	2⅔ slices 3½" x 4" x ¼"	1.4	100	3.6	.010	.059	.0006	+	22	–	+
Bread, rye	Slice 3½" x 4" x ¼"	0.6	38	1.4	.004	.022	.0002	+	8	–	+
Bread, white, with water	2 slices 3" x 3½" x ½"	1.4	100	3.6	.010	.036	.0004	–	–	–	–
Bread, white, with yeast food	2 slices 3" x 3½" x ½"	1.4	100	3.6	.062	.036	.0004	–	–	–	–
Bread, white, raisin	Slice 3¾" x 3½" x ½"	1.2	100	4.3	.018	.031	.0003	30	3	–	5
Bread, whole wheat, raisin	Slice 3¾" x 3⅛" x ½"	1.3	100	4.4	.019	.057	.0007	38	54	–	28
Broccoli, steamed	2⅙ cups	9.5	100	8.9	.378	.184	.0037	7068	27	240	378
Brussels sprouts, cooked	12 sprouts 1½" diam.	6.2	100	7.8	.047	.210	.0021	435	50	475	+
Butter	1 tbsp.	0.5	100	0.1	.002	.002	–	384	–	–	–
Butter	1 square 1¼" x 1¼" x ¼"	0.3	50	–	.001	.001	–	192	–	–	–
Butter	1 cup	8.0	1744	2.2	.032	.040	.0005	6665	–	–	–
Brown Betty	⅕ cup	2.1	100	0.9	.005	.013	.0002	106	–	–	7
Brown Betty	1 cup	10.2	500	4.5	.023	.053	.0009	532	–	–	36
Brown sauce	½ cup	3.4	100	0.7	.001	.007	–	300			

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Brown sugar sauce	⅛ cup	3.0	100	–	.022	.003	.0006				
Buttermilk	1 cup	8.5	84	8.6	.252	.233	.0007	5	13	67	76
Buttermilk	1⅛ cups	10.1	100	10.2	.299	.277	.0009	5	15	80	90
Butternuts	4–5 nuts	0.5	100	4.1							
Cabbage and apple salad	1 serving[1]	3.2	100	1.1	.021	.032	.0003	76	18	229	31
Cabbage, buttered	¾ cup	5.8	100	2.5	.072	.055	.0007	263	32	88	80
Cabbage, escalloped	⅜ cup	2.4	100	3.0	.085	.066	.0005	246	9	20	44
Cabbage, salad	¾ cup	2.8	100	1.0	.030	.018	.0008	30	16	220	50
Cabbage, shredded	3½ cups chopped, 4–5 cups shredded	11.2	100	5.1	.143	.108	.0014	143	80	1750	159
Cake, two-egg[2]	Piece 2″ x 2¼″ x 1″	0.8	100	1.5	.009	.018	.0002	162	2		8
Cantaloupe	1 melon 5″ diam.	27.1	100	2.2	.062	.058	.0014	1164	37	1230	
Capon, roast	Slice 4″ x 2½″ x ¼″	1.7	100	12.8	.007	.138	.0019		+	–	+
Caramel pudding	1 small serving[1]	4.0	100	1.8	.065	.050	.0001	87	2	12	17
Carrot and orange salad	1 small serving[1]	4.6	100	1.3	.070	.044	.0006	1929	21	340	66
Carrots, buttered	½ cup	3.0	100	1.0	.045	.040	.0006	2431	19	40	48
Carrots, creamed	¾ cup	4.5	100	2.6	.096	.080	.0006	2020	18	44	55
Carrots, fresh, cooked	1⅜ cups of ½″ cubes (4–5 young carrots 3–4″ long)	7.8	100	2.4	.102	.091	.0014	5138	42	93	111
Carrots, fresh, raw	1 tbsp. grated	0.4	5	0.1	.005	.005	.0001	256	3	7	6
Cauliflower, cooked	1 small head 4½″ diam.	11.6	100	6.8	.070	.197	.0031	123	64	1610	197
Celery, raw	4 cups of ¼″ pieces	17.5	100	6.4	.390	.237	.0031	56	60	500	
Celery soup, cream of	½ cup	3.6	100	3.3	.115	.090	.0005	239	4	40	21
Charlotte Russe, cream filling	⅙ cup	1.5	100	0.9	.034	.023	–	225		2	4
Cheese, American	1⅛″ cube	0.8	100	6.5	.211	.159	.0003	432	3	–	46
Cheese, American	1 tbsp. grated	0.3	33	2.2	.070	.053	.0001	144	1	–	15

[1] For serving consult Table II, Dietary Recipes.
[2] For other cakes see Angel, Chocolate, Fruit, etc.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B_1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Cheese, American	1 cup grated	4.0	498	32.4	1.051	.792	.0015	2153	16	–	230
Cheese and pineapple salad	½ serving[1]	1.7	100	1.5	.044	.038	.0002	315	12	110	18
Cheese, Camembert	2¼″ sector 1″ thick radius 2¼″	1.6	126	9.5	.306	.226	.0004	+	+	–	+
Cheese, cottage	5 tbsp.	3.2	100	19.0	.075	.240	–	56	+	–	+
Cheese fondue	Piece 1″ x 2″ x 2½″	1.5	100	5.8	.236	.119	.0006	427	5		38
Cheese, full cream	Piece 2″ x 1″ x ⅝″	0.9	100	2.9	.094	.069	.0001	683	1	–	12
Cheese, Roquefort	Piece 1½″ x 1¼″ x ⅞″	1.0	100	6.2	.200	.147	.0003	+	+	–	+
Cheese sauce	¼ cup	2.0	100	3.8	.120	.092	.0003	285	3	–	29
Cheese, soft cream	Piece 2¾″ x 2⅛″ x ¾″	3.0	328	9.5	.308	.226	.0004	2254	5	–	39
Cheese, soft cream	2 tbsp.	0.9	100	2.9	.094	.069	.0001	683	2	–	12
Cheese soufflé	½ cup	1.7	100	4.7	.071	.093	.0006	520		4	43
Cheese straws	3 straws 5″ x ⅜″ x ⅜″	0.8	100	4.4	.106	.089	.0002	247	+	–	23
Cheese, Parmesan	⅜ cup	0.9	100	11.1	.359	.263	.0005	245	2	–	+
Cheese, Swiss	Slice 4½″ x 3½″ x ⅛″	0.8	100	6.4	.253	.189	.0003	+	+	–	35
Cheese, toasted, on saltines	1½ tbsp. cheese, 3 crackers	0.8	100	3.4	.108	.092	.0004	187	+	–	+
Cherries, candied	10 medium cherries	1.0	100	0.1	.003	.005	.0001	60	+		
Cherries, stoned, fresh	1 cup	4.5	100	1.3	.025	.038	.0005	432	+	260	
Cherries, sweet, fresh	20 cherries ⅞″ diam.	4.7	100	1.3	.025	.038	.0005	432	+	260	
Chestnuts, Italian, shelled	7 nuts	1.5	100	2.5	.014	.040	.0003	–	23		+
Chicken, canned, boned	¼ cup	1.6	100	12.3	.007	.133	.0018	–	+	–	+
Chicken, canned, boned	1 cup or 1 small can	6.0	384	47.1	.027	.510	.0069	–	+	–	+
Chicken, creamed	2½ tbsp.	1.6	100	7.3	.037	.092	.0009	141	8	–	41
Chicken, lean meat, cooked	3 slices 3½″ x 2½″ x ¼″	3.2	100	19.9	.012	.215	.0030		+	–	+
Chicken salad	¼ cup	1.6	100	4.8	.017	.062	.0006	30	3	31	5

[1] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B_1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Chocolate, beverage, milk and water, half and half	½ cup (scant)	4.1	100	2.8	.071	.079	.0003	91	3	14	33
Chocolate, beverage, made with milk	⅓ cup	3.1	100	4.2	.101	.097	.0003	134	5	20	47
Chocolate blanc mange	¼ cup (scant)	1.9	100	2.5	.071	.075	.0002	85	3	8	32
Chocolate cream mints	1 mint 3" diam.	1.6	175								
Chocolate drop cookies	1½ cookies 2¼" diam.	0.8	100	1.8	.012	.036	.0001	133	5	1	5
Chocolate fudge	Piece 1½" x ¾" x 1"	0.9	100	0.5	.011	.018	.0001	27	–	–	2
Chocolate loaf cake	Piece 2½" x 2½" x ⅞"	0.9	100	1.7	.015	.032	.0001	162	1	–	8
Chocolate nut caramels	2 caramels ¾" cubes	0.7	100								
Chocolate nut fudge	Piece 1¼" x 1" x ¾"	0.9	100	1.0	.011	.018	.0002	39	1		4
Chocolate peppermints	3 mints 1" diam.	1.0	100	–	–	–	–	–	–	–	–
Chocolate, sweet milk	Piece 2¼" x 1" x ⅛"	0.7	100	1.8							
Chocolate, unsweetened	1 tbsp. grated	0.2	29	0.6	.004	.023	.0001				
Chocolate, unsweetened	1 square	1.0	173	3.7	.026	.135	.0008				
Citron, dried	Piece 1¼" x 1" x 1"	1.1	100								
Citron, dried, chopped	1 cup	2.8	246								
Clams, long	20 clams	6.9	100	16.7	.242	.206	.0080	30			10
Clams, round	12 clams or ⅔ cup	7.6	100	14.0	.229	.250	.0095	30			10
Cocoa, beverage, with dried milk	½ cup	3.0	100	3.8	.126	.113	.0003	123	10	27	67
Cocoa, beverage, with evaporated milk	⅜ cup	3.6	100	3.1	.165	.141	.0005	168	6	+	68
Cocoa, beverage, with milk and lactose	⅓ cup	2.9	100	2.9	.093	.084	.0002	121	4	17	24
Cocoa, beverage, with milk	½ cup (scant)	3.8	100	3.8	.124	.110	.0003	170	6	22	61

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

MATERIAL	MEASURE	WEIGHT OUNCES	TOTAL CALORIES	PROTEIN GRAMS	CALCIUM GRAMS	PHOSPHORUS GRAMS	IRON GRAMS	VITAMINS			
								A I. U.	B_1 I. U.	C I. U.	G S. U.
Cocoa, beverage, with milk and water, half and half	⅔ cup	5.6	100	3.5	.101	.101	.0003	127	4	18	46
Cocoa, powder	2½ tbsp.	0.7	100	4.3	.023	.143	.0005				
Cocoa, powder	1 tbsp.	0.3	40	1.7	.009	.057	.0002				
Cocoa tapioca	¼ cup	2.6	100	2.3	.064	.070	.0003	87	3	10	31
Coconut caramels	2 caramels ¾" cubes	0.7	100	0.8							
Coconut custard pie	Piece 1" at circumference	1.7	100	2.8	.039	.048	.0005	201	5	5	30
Coconut custard pie	Piece 4½" at circumference	8.1	475	13.3	.187	.233	.0023	951	23	24	142
Coconut, prepared	3 tbsp.	0.5	100	0.9	.009	.023		+	+	–	+ +
Codfish balls	1 ball 2" diam.	1.7	100	5.2	.012	.070	.0007	145	1		15
Codfish, creamed	½ cup	2.5	100	7.0	.046	.120	.0002	155		–	
Cod liver oil	1 tbsp.	0.4	100	–	–	–	–	3585[1]	–	–	–
Cod steak, steamed	Piece 3¾" x 2½" x ¾"	4.0	100	23.7	.013	.238	.0005	5	8	–	+
Cod steak, uncooked	Piece 3¾" x 2½" x 1"	4.9	100	23.7	.013	.238	.0005	5	12	–	+
Coffee jelly	1¼ cups	9.9	100	5.1							
Cole slaw	1 cup	2.8	100	1.5	.046	.035	.0003	276	15	332	30
Cole slaw with green pepper	1½ cups	4.8	100	2.6	.078	.065	.0005	330	24	870	48
Consommé	4 cups	32.0	100	22.5							
Cookies, see Chocolate, Hermits, Marguerites, Molasses, Oatmeal, Peanut, Plain											
Corn, a la Southern	⅓ cup	3.4	100	4.0	.056	.107	.0005	235	4	59	25
Corn bread	Slice 2" x 2" x 1"	1.2	100	2.4	.020	.037	.0003				
Corn, canned	⅓ cup	3.6	100	2.9	.006	.100	.0005	+	+	100	+
Corn chowder	⅓ cup	3.3	100	2.7	.050	.070	.0004	105	7	52	18
Cornflakes	¾ cup	0.9	100	2.1	.004	.029	.0007				
Corn, fresh cut from cob	½ cup	3.5	100	3.3	.006	.100	.0005	+	+	200	+
Corn, fresh on cob	2 ears 6" long	9.0	100	3.3	.006	.100	.0005	+	+	200	+
Cornmeal, cooked	⅔ cup	6.0	100	2.6	.005	.043	.0003	126[2]	18	–	9

[1] U.S.P. Standard. For various brands, see container.
[2] None in white.

Table I.—Nutritive Values of Foods (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Cornmeal, uncooked	1 tbsp.	0.3	33	0.9	.002	.014	.0001	42[1]	6	–	3
Cornmeal, uncooked	1 cup	5.0	504	13.2	.025	.217	.0013	634[1]	91	–	45
Corn, puffed	1¼ cups	1.0	100	2.1	.004	.029	.0007			–	
Corn soup, cream of	½ cup	3.9	100	3.1	.053	.090	.0003	115	2	59	13
Cornstarch	1 tbsp.	0.3	34	–	–	–	–	–	–	–	–
Cornstarch	1 cup	4.5	459	–	–	–	–	–	–	–	–
Cornstarch blanc mange	¼ cup	2.7	100	2.5	.078	.062	.0002	108	3	9	38
Corn syrup, dark	1⅓ tbsp.	1.0	100	–	.017	.002	.0038	–	–	–	–
Corn syrup, light	1⅓ tbsp.	1.0	100	–	.003	.002	.0004	–	–	–	–
Cottage pudding	Slice 1¾″ x 2″ x 2½″	1.1	100	2.0	.015	.027	.0002	131	2	3	7
Cottolene	1 tbsp.	0.4	100	–	–	–	–	–	–	–	–
Cottolene	1 cup	6.3	1575	–	–	–	–	–	–	–	–
Cottonseed oil	1 tbsp.	0.4	100	–	–	–	–	–	–	–	–
Crab meat, canned	¾ cup	4.4	100	19.9	.022	.228	.0011	–	+	–	+
Cracker crumbs	1 tbsp.	0.3	29	0.8	.001	.007	.0001	–	–	–	–
Cracker meal	1 cup	4.2	467	13.1	.024	.117	.0017	–	–	–	–
Crackers, Graham	2½ crackers, 2½″ x 2¾″ x ¼″	0.8	100	2.4	.005	.048	.0005	–	–	–	+
Crackers, Graham	1 cracker, 2½″ x 2¾″ x ¼″	0.3	40	1.0	.002	.019	.0002	–	–	–	+
Crackers, oyster	24 crackers, 1″ diam.	0.8	100	2.7	.007	.026	.0004	–	–	–	–
Crackers, oyster	1 cracker, 1″ diam.	0.04	5	0.1	–	.001	–	–	–	–	–
Crackers, pilot	1 cracker, 5″ diam.	1.2	130	3.8	.007	.033	.0005	–	–	–	–
Crackers, saltines	6 crackers, 2″ square	0.8	100	2.5	.005	.025	.0004	–	–	–	–
Crackers, soda	4 crackers, 2¾″ x 2½″	0.9	100	2.4	.005	.025	.0004	–	–	–	–
Crackers, water	3 crackers, ⅛″ thick, 2¼″ diam.	0.9	100	3.0	.005	.025	.0004	–	–	–	–
Crackers, water	1 cracker, ⅛″ thick, 2¼″ diam.	0.3	33	1.0	.001	.008	.0001	–	–	–	–
Crackers, whole wheat	4½ crackers, 2½″ x 1¾″	1.0	100	2.5	.008	.068	.0008	–	–	–	–

[1] None in white.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B₁ I. U.	Vitamins C I. U.	Vitamins G S. U.
Crackers, whole wheat	1 cracker, 2½" x 1¾"	0.2	22	0.6	.001	.016	.0002			–	
Cranberries, fresh	2 cups	7.6	100	0.9	.025	.021	.0009	33	–	530	
Cranberry jelly	2 tbsp.	1.5	100	0.1	.004	.003	.0001	5	–	39	
Cranberry jelly	1 cup	8.6	566	0.7	.021	.018	.0008	27	–	221	
Cranberry pie	Piece 1⅛" at circumference	1.4	100	0.5	.003	.006	.0001	3	–	27	
Cranberry pie	Piece 4½" at circumference	4.9	335	1.9	.008	.020	.0003	11	–	89	
Cranberry pudding, steamed	⅙ cup	1.1	100	2.0	.008	.024	.0001	171	1	8	7
Cranberry sauce	¼ cup (scant)	1.5	100	0.1	.004	.003	.0001	5		39	
Cream, thick (40% fat)	1 tbsp. plain or 1¾ tbsp. whipped	0.6	60	0.4	.014	.011	–	185			
Cream, thick (40% fat)	1⅔ tbsp.	0.9	100	0.6	.023	.018	–	309			
Cream, thick (40% fat)	1 cup	7.8	842	5.1	.194	.151	.0004	2595			
Cream, thin (18.5% fat)	1 tbsp.	0.6	30	0.4	.015	.013	–	86			
Cream, thin (18.5% fat)	¼ cup (scant)	1.8	100	1.3	.050	.044	.0001	284			
Cream, thin (18.5% fat)	1 cup	8.0	440	5.7	.220	.194	.0004	1246			
Cream filling (custard)	3⅓ tbsp.	1.8	100	2.7	.055	.056	.0003	179	4	9	24
Cream filling (custard)	1 cup	9.1	494	13.3	.272	.276	.0015	882	20	45	119
Cream filling (thick cream)	¼ cup	1.2	100	0.8	.025	.019	–	234	–	2	4
Cream puff shells	1½ puffs	0.8	100	2.5	.010	.037	.0004	411	4	–	18
Cream pie with meringue	Piece 1¾" at circumference	1.6	100	2.6	.041	.049	.0003	141	4	4	18
Cream pie with meringue	Piece 4½" at circumference	4.1	250	6.5	.103	.122	.0008	352	10	10	45
Cream sauce	⅙ cup	1.1	100	0.7	.027	.021		222	–	2	3
Cream sauce	1 cup	6.6	582	4.1	.158	.123	.0002	1290	–	11	15
Crisco	1 tbsp.	0.4	100	–	–	–	–	–	–	–	–
Crisco	1 cup	6.3	1602	–	–	–	–	–	–	–	–
Croutons (fried)	15 croutons, ½" cubes	0.8	100	2.0	.005	.020	.0002	–	–	–	–
Croutons (toasted)	27 croutons, ½" cubes	1.4	100	3.6	.010	.036	.0004	–	–	–	–

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	B_1 I. U.	C I. U.	G S. U.
Cucumbers	2 cucumbers, 10″ long	25.8	100	5.1	.073	.153	.0024	207	+	1830	–
Cup cakes, plain	½ cake, 2″ diam. 2″ thick	0.9	100	1.9	.010	.024	.0001	168	40	1	8
Currants, dried	1 cup	5.5	502	3.8	.126	.306	.0062			–	
Currants, dried	⅕ cup	1.1	100	0.8	.025	.061	.0012			–	
Currants, fresh	1½ cups	5.8	100	2.6	.043	.006	.0012			550	
Currants, fresh	1 cup	4.0	66	1.7	.028	.004	.0008			363	
Custard, boiled	⅓ cup (scant)	2.2	100	2.9	.069	.092	.0007	279	9	7	33
Custard, cup	⅓ cup	2.9	100	4.2	.097	.092	.0006	327	8	9	61
Custard pie	Piece 1¾″ at circumference	1.8	100	3.1	.052	.060	.0003	173	4	5	21
Custard pie	Piece 4½″ at circumference	3.6	200	6.2	.104	.120	.0006	346	8	10	42
Dandelion greens, cooked	2½ cups	6.7	100	5.2	.160	.067	.0058	35815	+ +	20	+ +
Date pudding I	Slice 1″ x 1″ x 1½″	0.8	100	0.9	.012	.017	.0006	9	4	–	2
Date pudding II	Slice 3″ diam. ½″ thick	1.1	100	1.9	.033	.039	.0010	125	8	1	11
Dates, stoned	1 cup	6.2	608	3.7	.122	.097	.0063	147	37	–	
Dates, unstoned	3-4 dates	1.1	100	0.6	.020	.016	.0010	24	6	–	
Doughnuts	⅓ doughnut	0.6	100	1.4	.009	.018	.0002	33	1		5
Egg and tomato salad	1 serving[1]	4.4	100	5.4	.037	.112	.0015	1125	38	466	73
Egg lemonade	½ cup	4.8	100	3.3	.018	.052	.0008	369	7	168	36
Eggnog	½ cup (scant)	3.7	100	5.3	.105	.118	.0008	430	10	17	54
Egg plant	6 slices, 4″ diam., ½″ thick	12.6	100	4.3	.039	.111	.0018	135	72	250	–
Egg salad	⅖ serving[1]	1.4	100	3.2	.017	.063	.0008	366	10	12	38
Egg salad	1 serving[1]	3.3	232	7.4	.039	.147	.0018	850	23	28	88
Egg timbale	⅜ cup	4.2	100	6.3	.125	.142	.0009	498	12	21	64
Eggs, á la goldenrod	⅓ serving[1]	2.0	100	4.5	.041	.072	.0006	355	6	5	31
Eggs, á la goldenrod	1 serving[1]	5.7	286	12.9	.117	.206	.0017	1015	17	14	89
Eggs, deviled	1 egg	1.9	100	6.5	.036	.111	.0014	798	14	–	68
Eggs, in shell	1⅓ eggs	2.7	100	9.1	.042	.151	.0020	1005	20	–	97
Eggs, in shell	1 egg	1.9	70	6.3	.029	.106	.0014	702	14	–	68
Eggs, poached on spinach	¾ egg, ⅔ cup spinach	5.0	100	6.7	.024	.118	.0029	8409	20	309	124
Eggs, scrambled	¼ cup	2.1	100	5.8	.046	.104	.0011	719	12	–	61
Eggs, whites	1 white	1.0	14	3.4	.004	.004	–	–	–	–	27
Eggs, whites	7 whites	6.9	100	24.1	.026	.029	.0002	–	–	–	196

[1] For servings consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Eggs, yolks	1 yolk	0.6	56	2.4	.020	.091	.0013	421	14	–	35
Eggs, yolks	2 yolks	1.0	100	4.3	.036	.163	.0024	725	25	–	63
Endive	7 stalks, 5¾″ long	14.7	100	6.6	.430	.161	.0050	+	140	830	
Evaporated milk sauce	⅙ cup	1.7	100	2.7	.124	.094	.0003	85	5	30	53
Farina, dark, cooked	¾ cup	6.0	100	3.0	.013	.118	.0014	3	17	–	22
Farina, dark, with wheat germ, cooked	¾ cup	6.0	100	3.9	.011	.110	.0011	–	66	–	91
Farina, light, cooked	¾ cup	6.0	100	3.0	.006	.035	.0002	–	–	–	–
Farina, light, uncooked	1 tbsp.	0.3	34	1.0	.002	.012	.0001	–	–	–	–
Farina, light, uncooked	1 cup	6.0	615	18.7	.037	.216	.0014	–	3	–	–
Figs, dried	1⅓ large	1.1	100	1.4	.051	.037	.0009	16	5	10	13
Figs, dried, chopped	1 cup	5.6	504	6.8	.257	.186	.0046	83	27	50	65
Figs, fresh	3 small, 1½″ diam.	4.3	100	1.7	.063	.043	.0009	50	21	50	–
Filberts	8-10 nuts	0.5	100	2.2	.041	.050	.0006		15		
Flounder, fresh, entrails removed	1 fish, 8″ long without head and tail	12.5	100	22.9	.058	.263	.0011	+	+	–	+
Flour, buckwheat	1 tbsp.	0.4	40	0.7	.001	.020	.0001			–	
Flour, rice	1 tbsp.	0.5	50	1.1						–	
Flour, rice	1 cup	8.5	867	21.2						–	
Flour, rye	1 tbsp.	0.3	33	0.7	.002	.028	.0001		5	–	
Flour, rye	1 cup	5.0	496	9.7	.025	.414	.0021		74	–	
Flour, wheat, white, sifted	1 tbsp.	0.3	25	0.8	.001	.007	.0001	–	–	–	–
Flour, wheat, white, sifted	4 tbsp.	1.0	100	3.2	.004	.029	.0003	–	–	–	–
Flour, wheat, white, sifted	1 cup	3.9	395	13.1	.016	.115	.0011	–	2	–	–
Flour, wheat, white, unsifted	1 tbsp.	0.3	33	1.1	.001	.010	.0001	–	–	–	–
Flour, wheat, white, unsifted	1 cup	4.5	451	14.5	.018	.131	.0013	–	2	–	–
Flour, whole wheat, sifted	4½ tbsp.	1.0	100	3.8	.010	.085	.0010	3	40	–	22
Flour, whole wheat, sifted	1 cup	3.9	400	15.2	.040	.340	.0039	12	156	–	88
Frankfurters	1 sausage	1.4	100	7.8	.004	.086	.0010	+	+		+
French salad dressing	1⅓ tbsp.	0.6	100	–	–	–	–	–	–	–	–

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B_1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Fruit balls	1 ball 1⅛″ diam.	1.0	100	1.2	.026	.038	.0006	85	6	9	15
Fruit cake	Piece 1⅞″ x 1⅞″ x ⅜″	0.9	100	1.1	.011	.035	.0018	44	3		7
Fruit cocktail	⅜ cup	3.4	100	0.6	.012	.015	.0003	30	13	396	29
Fruit cocktail	1 cup	7.1	206	1.2	.025	.031	.0006	63	27	815	60
Fruit punch	½ cup (scant)	3.6	100	0.1	.004	.002	–	4	3	97	3
Fruit salad	¼ cup fruit, ½ tbsp. dressing	1.5	100	0.8	.009	.018	.0002	20	11	84	6
Gelatin, granulated	1 tbsp.	0.3	29	7.3	–	–	–	–	–	–	–
Ginger ale	1½ cups	12.0	100	–	–	–	–	–	–	–	–
Gingerbread, hot water	Piece 1″ x 1⅜″ x 2″	1.1	100	1.7	.035	.017	.0009	69	–	–	–
Gingerbread, sour milk	Piece 1″ x 2″ x 2″	1.1	100	2.0	.045	.025	.0009	83	–	2	3
Ginger, crystallized	6 pieces 1½″ x ¾″ x ¼″	1.0	100	0.2	–	–	–	–	–	–	–
Ginger snaps	6 snaps	0.6	100	2.4	.003	.022	.0002	–	–	–	–
Ginger snaps	1 snap 1¾″ diam.	0.1	16	0.4	–	.004	–	–	–	–	–
Grapefruit, in skin	½ medium	10.0	100	1.7	.044	.043	.0006	–	22	1380	85
Grapefruit without skin	½ medium	7.5	100	1.7	.044	.043	.0006	–	22	1380	85
Grape juice	⅜ cup	3.5	100	0.4	.016	.014	.0004	–	–	–	–
Grapenuts	¼ cup	1.0	100	3.0							
Grapes, Concord	1 large bunch	6.9	100	1.8	.024	.045	.0009	24	13	40	–
Grapes, Malaga	25-30 grapes	4.5	100	1.8	.024	.045	.0009	24	13	40	–
Griddle cakes	1 cake 4½″ diam.	1.8	100	3.6	.047	.060	.0002	135	3	8	17
Gumdrops	3 large gumdrops ⅞″ diam. or 25 very small	1.0	100	–	–	–	–	–	–	–	–
Halibut steak, cooked	Piece 3″ x 1¼″ x 1″	3.0	100	15.3	.007	.165	.0008	+	+	–	+
Ham, boiled, lean only	Slice 5″ x 5″ x ⅛″	1.7	100	10.8	.008	.115	.0012	+	+ +	–	+ +
Hamburg steak, see Beef											
Hard sauce	1 tbsp.	0.7	100	–	–	–	–	204	–	–	–
Hash, beef	¼ cup	1.7	100	8.5	.009	.106	.0014	67	7	40	46
Hermits	2½ cookies 2″ diam.	0.9	100	1.4	.005	.018	.0001	136	–	–	4
Hermits	1 cooky 2″ diam.	0.4	40	0.6	.002	.007	–	56		–	1
Hickory nuts, in shell	12-15 nuts	0.5	100	2.2							

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B_1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Hickory nuts, chopped	1 cup	6.0	1214	26.2							
Hominy grits, cooked	⅘ cup	6.8	100	2.4	.004	.020	.0003		–		
Hominy grits, cooked	1 cup	9.0	141	3.3	.006	.028	.0004		–		
Hominy grits, uncooked	1 cup	5.5	553	12.9	.022	.111	.0014		–		
Honey	1 tbsp.	1.1	100	0.1	.001	.006	.0002	–	–	–	–
Huckleberries, fresh	1 cup	5.2	100	0.9	.037	.029	.0013	28		220	7
Ice cream, commercial	¼ cup	1.6	100	1.1	.041	.032	.0001	295	2	8	11
Ice cream, French	¼ cup	2.0	100	1.6	.052	.046	–	194	1	4	7
Ice cream, Philadelphia	3 tbsp.	1.4	100	0.9	.037	.033	–	210			
Ice cream, peach, see Peach ice cream											
Irish stew with dumplings	¼ cup stew, ¼ dumpling	1.9	100	2.6	.008	.034	.0004	84	2	20	7
Irish stew with dumplings	1 cup stew, 1 dumpling	8.4	440	11.4	.035	.150	.0017	369	8	88	30
Jellied vegetable salad, see Perfection salad											
Jelly (fruit)	1¾ tbsp.	1.1	100								
Jello	1 box	3.3	362	10.0							
Jelly beans	15 beans	1.5	100	–							
Junket, plain	⅜ cup	4.0	100	3.9	.125	.100	.0003	165	6	23	34
Junket, plain	1 cup	10.7	267	10.4	.334	.267	.0008	440	16	61	91
Kale, cooked	2⅔ cups	8.0	100	6.7	.355	.131	.0049	38090	36	+	392
Kale, cooked	1 cup	3.0	37	2.5	.132	.048	.0018	14095	13	+	145
Kohl-rabi, buttered	⅝ cup	3.8	100	1.9	.067	.039	.0005	265	11	473	
Kohl-rabi, buttered	1 cup	6.1	163	3.1	.109	.064	.0008	435	18	770	
Kohl-rabi, creamed	½ cup	4.8	100	3.8	.123	.089	.0006	207	11	378	19
Koumiss	1 quart	34.4	504	27.4							
Lactose	3½ tbsp.	0.9	100	–	–	–	–	–	–	–	–
Lady fingers	2-4 fingers	1.0	100	2.4	.014	.035	.0006	222	5	–	24
Lamb chops, broiled	Lean meat of one chop, 2″ x 1½″ x ¾″	1.6	100	6.1	.004	.066	.0009	–	18	–	31
Lamb, leg, roast	Slice, 3½″ x 4½″ x ⅛″	1.8	100	10.2	.006	.110	.0008	–	19	–	+
Lard	1 tbsp. (scant)	0.4	100	–	–	–	–	–	–	–	–
Lard	1 cup	8.0	2042	–	–	–	–	–	–	–	–

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

MATERIAL	MEASURE	WEIGHT OUNCES	TOTAL CALORIES	PROTEIN GRAMS	CALCIUM GRAMS	PHOSPHORUS GRAMS	IRON GRAMS	VITAMINS A I. U.	B1 I. U.	C I. U.	G S. U.
Leeks	7 leeks, 5" long	7.8	100	5.6	.129	.124	.0014	–	61	560	
Lemons, whole	3 large	11.4	100	2.3	.052	.023	.0014	–	+	1480	+
Lemons, whole	1 medium	3.4	30	0.7	.016	.007	.0004	–	+	444	+
Lemonade	1 cup	8.0	72	–	.005	.002	.0001	–		134	
Lemonade, egg	1 cup	9.0	190	6.3	.035	.109	.0016	702	14	167	68
Lemonade, lactose	1 cup	8.6	356	–	.006	.003	–	–		167	
Lemon ice	½ cup (scant)	3.1	100	–	.003	.001	.0001	–		84	
Lemon jelly	½ cup	3.8	100	1.5	–	–				84	
Lemon juice	1 tbsp.	0.5	5	–	.003	.001	.0001	–		84	
Lemon juice	1⅛ cups	9.0	100	–	.058	.025	.0015	–	+	1670	+
Lemon meringue pie	Piece 1" at circumference	1.0	100	1.4	.006	.016	.0002	91	2	2	9
Lemon meringue pie	Piece 4½" at circumference	4.5	450	6.1	.028	.070	.0010	408	9	10	41
Lemon milk sherbet	¼ cup	1.9	100	1.4	.051	.039	.0001	66	2	42	13
Lemon sauce	⅛ cup	1.5	100	–	–	–	–	113		20	
Lentil and tomato soup	⅚ cup	6.7	100	6.9	.033	.112	.0023	418	12	246	32
Lentils, dried	2½ tbsp.	1.0	100	7.4	.029	.110	.0025		9	–	21
Lettuce	2 large heads	20.2	100	6.9	.100	.235	.0029	537	109	400	143
Lettuce	2 large leaves	1.2	6	0.4	.006	.014	.0002	31	7	24	9
Liver, see Beef											
Liver and noodle loaf	Piece 2" x 2" x 1½"	2.1	100	6.9	.020	.121	.0022	1815	13	+	207
Lobster, canned	¾ cup	4.2	100	18.4	.054	.246	.0007				
Loganberry juice	⅓ cup	2.3	100								
Lollipops	2 lollipops 2" diam.	1.0	100	–	–	–	–	–	–	–	–
Macaroni and cheese	⅜ cup	2.1	100	4.0	.078	.076	.0002	194	1	4	18
Macaroni, cooked	¾ cup	5.8	100	3.8	.006	.040	.0003	–	–	–	–
Macaroni croquettes	1 croquette	1.2	100	2.8	.017	.038	–	174	1	3	7
Macaroni, uncooked	¼ cup of 1" pieces	1.0	100	3.8	.006	.040	.0003	–	–	–	–
Macaroni, uncooked	1 cup or 10 sticks 9" long	3.5	355	13.4	.021	.142	.0009	–	2	–	–
Macaroni, with tomato sauce	5 tbsp.	3.6	100	2.6	.008	.035	.0003	457	9	189	11
Macaroons	2 macaroons	0.8	100	1.5							
Mackerel, Spanish, fresh, entrails removed	1 fish 11" long without head or tail	18.7	413	55.6	.033	.815	.0026	+	+		+

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B_1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Mackerel, Spanish, fresh, entrails removed	Cross-section, 2½″ on back	4.5	100	13.5	.008	.197	.0006	+	+		+
Mackerel, Spanish, broiled	Cross-section, 2½″ on back	2.6	100	13.5	.008	.197	.0006	+			+
Maple sugar	Piece 1¾″ x 1¼″ x ½″	1.1	100	–	.043	.006	.0012	–	–	–	–
Maple syrup	1½ tbsp.	1.2	100	–	.037	.005	.0010	–	–	–	–
Marguerites	2 crackers	0.9	100	2.9	.008	.029	.0002	–	8	–	8
Marshmallows	5 marshmallows, 1¼″ diam.	1.0	100								
Mayonnaise dressing	1 tbsp.	0.5	100	0.1	.001	.005	.0001	23	–	5	2
Milk, condensed, sweetened	1⅓ tbsp.	1.1	100	2.4	.091	.071	.0002	+	7	+	+
Milk, condensed, sweetened	1 cup	11.0	1031	24.8	.935	.731	.0021	+	75	+	+
Milk, evaporated, unsweetened	4½ tbsp.	2.5	100	4.9	.224	.173	.0005	233	9	+	95
Milk, evaporated, unsweetened	1 cup	8.0	320	15.7	.717	.554	.0016	746	29	+	304
Milk, dried, whole	3 tbsp. (scant)	0.7	100	4.9	.181	.140	.0003	180	15	40	99
Milk, malted	3 tbsp.	0.9	100	3.4	.092	.089	.0005	99	28	+	64
Milk, skim	1⅛ cups	9.6	100	9.3	.333	.262	.0008	4	31	64	87
Milk, skim	1 cup	8.5	88	8.1	.294	.231	.0007	3	27	56	77
Milk, skim	1 quart	34.4	358	33.2	1.190	.940	.0029	13	108	229	312
Milk, top 10 oz.	¼ cup	2.7	100	2.3	.082	.065	.0002	255	8	15	22
Milk, top 12 oz.	⅜ cup	3.0	100	2.6	.093	.073	.0002	270	8	17	25
Milk, whole	⅝ cup	5.1	100	4.8	.171	.135	.0004	226	16	32	46
Milk, whole	1 cup	8.5	170	8.1	.291	.230	.0006	386	27	54	78
Milk, whole	1 quart	34.4	676	32.2	1.159	.910	.0024	1531	108	217	312
Mince pie	Piece 1″ at circumference	1.2	100	1.8	.006	.024	.0003	6	2	9	5
Mince pie	Piece 4½″ at circumference	5.4	450	8.1	.027	.108	.0013	27	9	41	22
Mineral oil salad dressing, see Salad dressing											
Mints, chocolate cream	1 mint 3″ diam.	1.6	175								
Mock Hollandaise sauce	1¼ tbsp.	0.8	100	1.0	.021	.030	.0002	387	3	10	10
Mock Hollandaise sauce	1 cup	8.3	1045	11.0	.212	.296	.0027	3930	24	93	97

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

MATERIAL	MEASURE	WEIGHT OUNCES	TOTAL CALORIES	PROTEIN GRAMS	CALCIUM GRAMS	PHOSPHORUS GRAMS	IRON GRAMS	VITAMINS			
								A I. U.	B_1 I. U.	C I. U.	G S. U.
Molasses	1½ tbsp.	1.2	100	0.8	.090	.010	.0025	–	–	–	–
Molasses	1 tbsp.	0.8	65	0.5	.058	.007	.0017	–	–	–	–
Molasses	1 cup	10.0	815	6.7	.734	.082	.0207	–	–	–	–
Molasses cookies I	3 cookies, 2″ diam.	0.7	100	1.4	.033	.014	.0008	2	–	–	–
Molasses cookies II	2½ cookies, 2″ diam.	0.9	100	1.4	.027	.014	.0008	58	–	–	–
Molasses kisses	3 kisses	0.9	100	–							
Muffins, bran	1 muffin, 2¾″ diam.	2.0	115	4.6	.083	.150	.0031	101	12	6	15
Muffins, bran and wheat germ	1 muffin, 2¾″ diam.	1.5	114	5.0	.062	.162	.0018	141	23	–	30
Muffins, cornmeal	1 muffin, 2¾″ diam.	1.6	133	4.2	.037	.066	.0005	211	9	–	19
Muffins, date	1 muffin, 2¾″ diam.	2.5	200	4.8	.053	.092	.0013	189	15	4	22
Muffins, one egg	1 muffin, 2¾″ diam.	1.7	132	4.2	.039	.053	.0004	153	3	3	22
Muffins, twin mountain	1 muffin, 2¾″ diam.	1.5	150	3.5	.028	.049	.0003	270	2	4	13
Muffins, whole wheat	1 muffin, 2¾″ diam.	1.9	146	4.5	.042	.071	.0006	149	15	4	22
Muffins, whole wheat with molasses	1 muffin, 2¾″ diam.	1.9	133	4.0	.062	.070	.0014	43	16	4	15
Mutton, leg, roast	Slice 3″ x 3¾″ x ⅛″	1.2	100	8.3	.005	.089	.0012	–	26	–	+ +
Nabisco almonds	10 almonds	0.7	100	1.0							
Nabisco wafers	5 nabiscoes 2½″x1″x¼″	0.7	100	1.1							
Nut and cheese roast	Slice 1¼″ x 1¼″ x ¾″	0.9	100	3.9	.075	.078	.0003	160	8	10	15
Nut loaf	¼ cup	1.4	100	4.1	.035	.073	.0006	157	15	4	19
Oatmeal cookies, with raisins and nuts	1 cooky, 3″ diam.	0.9	133	3.7	.019	.059	.0006	45	10	1	15
Oatmeal cookies (Scottish Fancies)	1 cooky, ¾″ diam.	0.8	100	2.3	.012	.048	.0006	99	13	–	8
Oatmeal wafers	1 wafer, 2¾″ diam.	0.5	100	2.3	.008	.050	.0006				
Oats, rolled, uncooked	¼ cup	0.9	100	4.2	.017	.098	.0012	–	36		+
Oats, rolled, cooked	½ to ¾ cup	4.8	100	4.2	.017	.098	.0012		30		+
Okra	5–6 pods	2.0	20	1.6	.034	.033	.0003	237	24		+
Oleomargarine with vitamin A	1 tbsp.	0.5	100	0.3	.004	.004	.0001	384	–	–	–
Oleomargarine with vitamin A	1 cup	7.0	1492	4.5	.060	.060	.0009	5722	–	–	–

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins: A I. U.	Vitamins: B_1 I. U.	Vitamins: C I. U.	Vitamins: G S. U.
Olive oil	1 tbsp.	0.4	100	–	–	–	–	–	–	–	–
Olive oil	1 cup	7.3	1881	–	–	–	–	–	–	–	–
Olives, green, unstoned	12–16 medium	3.8	100	1.0	.095	.011	.0023	163	1		
Olives, green, stuffed	25 olives 5/8" long	2.5	100								
Olives, ripe, unstoned	8–10 medium	2.3	100	0.8	.068	.008	.0016	105	1		
Onions, cooked	3–4 medium	7.2	100	3.3	.084	.096	.0010	–	8	200	27
Onions, scalloped	1/3 cup	2.5	100	2.7	.050	.054	.0004	173	2	40	13
Orange chiffon pie	Piece 1 5/8" at circumference	1.3	100	2.5	.012	.026	.0004	188	6	40	18
Orange chiffon pie	Piece 4 1/2" at circumference	3.8	289	7.3	.032	.075	.0012	498	17	110	52
Orange ice	3/8 cup	3.2	100	0.2	.006	.004	.0001	18	13	231	12
Orange jelly with cream	5 tbsp. jelly, 1 tbsp. whipped cream	2.7	100	1.8	.013	.009	–	102	4	110	8
Orange juice	1 tbsp.	0.5	8	0.1	.003	.002	–	7	6	96	5
Orange juice	3/4 cup	6.4	100	1.1	.035	.024	.0004	96	73	1190	64
Orange milk sherbet	1/2 cup	3.8	100	2.5	.097	.070	.0003	138	9	210	55
Oranges, whole	1 large	9.5	100	1.8	.053	.041	.0011	95	73	1180	61
Oranges, whole	1 medium	7.6	80	1.4	.042	.033	.0009	75	58	944	49
Oyster stew I	1/3 cup	3.5	100	4.6	.086	.115	.0025	269	35	33	17
Oyster stew II	1/2 cup	4.7	100	4.8	.125	.130	.0019	273	27	35	29
Oysters	2/3 cup solids or 6–15 oysters	7.0	100	12.3	.112	.300	.0116	297	149	100	+ +
Pablum	12 tbsp.	1.0	100	4.1	.211	.167	.0081	38[1]	47[1]	–	28[1]
Parsnips, whole	1 parsnip, 7" long, 2" diam. at top	6.8	100	2.5	.092	.117	.0012	–	58		
Parsnips, stewed	7 pieces 3 1/2" x 1 1/2" x 1/8"	5.8	100	2.5	.092	.117	.0012	–	44		
Pea soup, green, cream of	2/3 cup	5.2	100	4.3	.072	.095	.0008	372	42	112	51
Pea soup, green, cream of	1 cup	8.0	150	6.5	.108	.142	.0012	560	62	168	77
Pea soup, split, I	1 cup	7.9	175	11.2	.018	.126	.0021	410	129	273	215
Pea soup, split, I	2/5 cup	4.5	100	6.4	.010	.072	.0015	234	74	156	123
Pea soup, split, II	2/3 cup	6.0	100	6.9	.023	.111	.0016	61	+ +	–	32
Pea soup, split, II	1 cup	9.0	150	10.3	.035	.167	.0024	92	+ +	–	47
Peach ice cream	1/4 cup	1.8	100	0.9	.032	.028	.0001	464	1	29	5
Peaches, canned	2 large halves and 3 tbsp. juice	7.5	100	1.5	.021	.032	.0004			110	

[1] Estimated from weights of known ingredients and average vitamin values.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

MATERIAL	MEASURE	WEIGHT OUNCES	TOTAL CALORIES	PROTEIN GRAMS	CALCIUM GRAMS	PHOSPHORUS GRAMS	IRON GRAMS	VITAMINS			
								A I. U.	B_1 I. U.	C I. U.	G S. U.
Peaches, fresh, whole	2 medium	7.8	100	1.0	.020	.038	.0007	2940[1]	+	180	
Peaches, stewed	½ cup	3.5	100	0.4	.009	.017	.0003	1305[1]		81	
Peanut brittle	2 squares, 1¼″ x 1¼″ x ⅜″	0.8	100	1.5	.005	.022	.0001				
Peanut butter	1 tbsp. (scant)	0.6	100	4.9	.012	.066	.0003	+	20	–	36
Peanut butter soup, cream of	⅓ cup (scant)	2.6	100	4.7	.084	.093	.0003	105	13	15	37
Peanut cookies	1¾ cookies 2″ in diam.	0.8	100	2.8	.010	.040	.0001	141	1	–	16
Peanuts, chopped	1 tbsp.	0.3	50	2.3	.006	.036	.0002	+	10	–	18
Peanuts, chopped	1 cup	3.7	575	27.0	.069	.414	.0023	+	115	–	207
Peanuts, shelled	20–24 single nuts	0.6	100	4.7	.012	.072	.0004	+	20	–	36
Peanuts, shelled	1 cup	4.3	663	31.2	.080	.477	.0027	+	130	–	240
Pears, canned	3 halves and 3 tbsp. juice	4.7	100	0.4	.012	.015	.0003				
Pears, fresh, whole	2 medium	6.3	100	1.1	.022	.027	.0006	17	28	110	79
Peas, canned, drained	½ cup	5.2	100	6.8	.023	.127	.0020				
Peas, creamed	½ cup	2.7	100	4.7	.061	.098	.0020	620	53	146	70
Peas, dried, split	1 tbsp.	0.5	46	3.4	.004	.035	.0007	+	+ +		+
Peas, dried, split	1 cup	7.5	675	45.7	.061	.505	.0104	+	+ +		+
Peas, green, shelled, cooked	¾ cup	3.5	100	7.0	.023	.127	.0020	750	113	200	100
Pecans, shelled	12 meats	0.5	100	1.3	.012	.046	.0004	21	7	–	
Pecans, shelled	1 cup	5.5	1145	15.0	.137	.525	.0040	240	80	–	
Penuchi	Piece, 1″ x 1″ x 1⅓″	0.9	100	0.9	.027	.019	.0006	25	6	2	2
Peppers, green	5 peppers, 3½″ long	12.2	100	4.2	.041	.096	.0014	2076	21	6900	+
Peppers, green, stuffed I	1 large pepper	4.7	100	2.9	.015	.042	.0005	578	4	1230	
Peppers, green, stuffed II	1 large pepper	7.0	100	2.5	.016	.047	.0006	711	9	1213	8
Peppers, green, stuffed III	⅖ large pepper	2.5	100	6.0	.009	.069	.0008	188		465	
	1 pepper	5.7	226	13.6	.020	.156	.0018	425		1050	
Perfection salad	1½ cups	7.0	100	3.3	.043	.030	.0004	632	4	490	6
Pie crust, plain, baked	Single crust of pie 9″ diam.	2.8	400	6.4	.008	.058	.0006		–	–	
Pie crust, plain, baked	¼ of one crust, 9″ diam.	0.7	100	1.6	.002	.014	.0001		–	–	
Pineapple and carrot salad	½ serving[2]	2.8	100	0.6	.018	.022	.0004	343	13	133	17

[1] None in white varieties.

[2] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Pineapple, canned	1 slice and 3 3 tbsp. juice or ¼ cup shredded	2.3	100	0.3	.005	.007	.0002	23	13	210	10
Pineapple, canned, shredded	1 cup	8.5	369	1.2	.018	.026	.0007	112	48	775	37
Pineapple, fresh	2 slices, ¾″ thick	6.2	100	0.7	.014	.019	.0007	78	44	440	44
Pineapple juice	⅔ cup	5.3	100	–	.024	.017	.0002	120	53	210	15
Pineapple marshmallow cup	⅖ cup	2.9	100	0.2	.005	.006	.0002	25	14	168	14
Pineapple marshmallow cup	1 cup	7.1	244	0.5	.012	.015	.0005	61	34	410	34
Pineapple salad	¼ serving[1]	1.4	100	2.2	.039	.036	–	276	6	57	7
Pine nuts	¼ cup	0.6	100	4.5							
Plain cookies	2 cookies, 2¼″ diam.	0.9	100	1.4	.004	.017	.0001	129	–	–	2
Plums, fresh, whole	4 plums, 1¾″ diam.	7.7	100	1.3	.036	.049	.0010		73	180	
Popcorn, popped	1½ cups	0.9	100	2.7							
Popcorn, unpopped	⅛ cup	0.9	100	2.7							
Popovers	1 popover	2.0	100	4.6	.046	.094	.0006	264	6	7	30
Pork chops, broiled	1 chop (lean meat only)	2.4	200	16.2	.006	.198	.0016	+	112	+	80
Pork sausage cooked	1⅔ sausages 3″ long, ¾″ diam.	1.1	100	5.0	.003	.054	.0008	+	+	–	+ +
Potato salad	¼ cup	1.7	100	1.0	.007	.031	.0005	33	11	58	15
Potato salad	1 cup	7.3	420	4.2	.029	.130	.0021	138	46	244	63
Potato soup	½ cup (scant)	4.2	100	3.8	.106	.102	.0006	166	13	62	37
Potatoes, sweet, in skins	½ medium	3.6	100	1.5	.017	.037	.0006	1561	28	100	28
Potatoes, sweet, baked	½ medium	3.0	100	1.5	.017	.037	.0006	1561	21	75	28
Potatoes, sweet, glazed	½ small	2.1	100	1.2	.014	.032	.0005	1317	18	42	23
Potatoes, white, whole	1 medium	5.3	100	2.6	.014	.064	.0011	25	24	130	30
Potatoes, white	¾ cup of ½″ cubes	4.2	100	2.6	.014	.064	.0011	25	24	130	30
Potatoes, white, baked	1 medium	3.0	100	2.6	.014	.064	.0011	25	24	130	30
Potatoes, white, boiled	1 medium	3.6	100	2.6	.014	.064	.0011	25	18	65	30

[1] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Potatoes, white, chips	8–10 large pieces	0.6	100	0.4	.002	.011	.0002	–	–	–	5
Potatoes, white, creamed	⅖ cup	2.7	100	2.5	.045	.060	.0006	166	10	65	33
Potatoes, white, creamed	1 cup	6.4	235	5.8	.106	.141	.0014	390	24	153	78
Potatoes, white, mashed	½ cup (scant)	3.1	100	2.3	.028	.180	.0010	124	1	80	28
Potatoes, white, riced	⅞ cup	4.2	100	2.6	.014	.064	.0011	25	18	130	30
Potatoes, white, scalloped	⅝ cup	3.5	100	3.0	.054	.075	.0008	107	14	87	30
Potatoes, white, scalloped	1 cup	5.7	163	4.9	.088	.122	.0013	174	23	142	49
Prune and cottage cheese salad	⅙ serving[1]	2.4	100	4.2	.026	.061	.0006	315	10	41	50
Prune pudding, Norwegian	3 tbsp.	2.0	100	0.3	.008	.012	.0004	205	4	26	36
Prune pudding, Norwegian	1 cup	8.7	433	1.3	.035	.052	.0017	888	17	113	157
Prune pulp	1 tbsp.	0.5	20	0.2	.005	.004	.0007	100	2	10	17
Prune pulp	4¾ tbsp.	2.8	100	1.0	.025	.020	.0035	500	12	50	87
Prune soufflé	⅜ cup	1.8	100	2.3	.011	.015	.0004	217	6	22	55
Prune soufflé	1 cup	4.8	258	5.9	.028	.039	.0010	560	16	57	142
Prunes, dried	4 medium	1.4	100	0.7	.019	.028	.0010	500	13	50	87
Prunes, stewed, sweetened	2 prunes and 2 tbsp. juice	2.8	100	0.4	.011	.016	.0006	280	6	21	50
Pumpkin, cooked	1 cup	6.5	70	2.7	.062	.124	.0025	+ +	+	137	
Pumpkin, cooked	1½ cups	9.3	100	3.9	.089	.177	.0036	+ +	+	195	
Radishes	3 doz. red button	12.0	100	4.4	.106	.106	.0028	–	43	1700	
Raisin pie	Piece 1″ at circumference	1.2	100	0.9	.009	.020	.0003	33	5	–	2
Raisin pie	Piece 4½″ at circumference	5.4	450	4.0	.039	.088	.0013	149	23	–	9
Raisin and cranberry pie	Piece 1⅛″ at circumference	1.0	100	0.9	.004	.013	.0001	3	1	5	2
Raisin and cranberry pie	Piece 4½″ at circumference	4.0	400	3.6	.016	.042	.0005	12	4	20	8
Raisins	¼ cup seeded or 2 tbsp. seedless	1.0	100	0.8	.017	.038	.0009	21	9	–	14
Raisins, seeded	1 cup	5.0	489	3.9	.083	.186	.0044	102	44	–	68
Raspberries, fresh	1⅛ cups	5.3	100	2.6	.061	.057	.0013	+ +	1	230	

[1] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Raspberry sherbet	¼ cup	2.1	100	0.9	.016	.015	.0003			73	2
Rhubarb, fresh	5 cups of 1" pieces	19.6	100	2.8	.243	.100	.0031		5	1850	
Rhubarb, stewed, sweetened	½ cup	3.9	100	0.2	.015	.006	.0002			115	
Rhubarb pie	Piece 1⅝" at circumference	1.7	100	1.3	.011	.016	.0002	40	1	58	4
Rhubarb pie	Piece 4½" at circumference	4.8	280	3.6	.031	.045	.0006	112	3	162	11
Rice dainty	¼ cup	1.9	100	0.6	.012	.013	.0001	129	7	115	5
Rice fondue on saltines	2½ tbsp. fondue, 1¼ saltines	1.4	100	5.6	.100	.109	.0007	400	4	–	40
Rice fondue on saltines	2 tbsp. fondue, 1 saltine	1.1	80	4.5	.080	.087	.0006	320	3	–	32
Rice pudding (with egg)	½ cup (scant)	3.1	100	4.2	.060	.082	.0006	306	7	9	36
Rice pudding (creamy)	¼ cup	2.2	100	3.1	.089	.078	.0002	120	4	17	24
Rice pudding (with raisins)	⅛ cup (scant)	1.5	100	1.3	.025	.035	.0002	41	3		11
Rice, puffed	1⅝ cups	1.0	100	2.2	.003	.027	.0003	–	–	–	–
Rice, steamed	¾ cup	4.0	100	2.3	.003	.028	.0003	–	–	–	–
Rice, uncooked	2 tbsp.	1.0	10	0.2	–	.003	–	–	–	–	–
Rice, uncooked	1 cup	7.0	696	16.1	.021	.196	.0021	–	–	–	–
Rice with cheese	¼ cup	1.6	100	4.5	.128	.107	.0003	228	2	8	30
Rice with cheese and tomatoes	¼ cup	2.1	100	4.8	.116	.107	.0004	411	5	102	31
Rolls, French	1 roll	1.3	100	3.0	.010	.036	.0004	–	–	–	–
Rutabagas, buttered	½ cup	3.7	100	1.2	.068	.052	.0005	261	10	280	37
Rutabagas, creamed	½ cup	4.5	100	2.6	.113	.089	.0006	193	12	288	49
Rutabagas, uncooked	1⅜ cups of ½" cubes	8.5	100	3.2	.180	.137	.0012	36	37	980	98
Rutabagas, whole	1 large, 7½" long, 4½" diam.	34.8	288	9.1	.519	.394	.0035	103	105	2820	282
Salad dressing, boiled	¼ cup	2.8	100	2.3	.057	.077	.0007	348	8	9	28
Salad dressing, French—see French salad dressing											
Salad dressing, mayonnaise—see Mayonnaise dressing											

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins			
								A I. U.	B_1 I. U.	C I. U.	G S. U.
Salad dressing, mineral oil	2 cups	16.0	100	3.8	.034	.141	.0021	640	17	134	54
Salmon, canned	⅝ cup	2.7	100	14.8	.050	.214	.0010	170	13		60
Salmon and peas, creamed on toast	½ cup salmon and peas, ½ slice toast	2.4	100	5.3	.077	.096	.0004	75	10	26	29
Salmon loaf	¼ cup	2.1	100	7.3	.014	.084	.0007	177	8		37
Sardines, canned	4 sardines 3″ long	1.3	100	8.5	.013	.136	.0007	+	+		
Sardine salad	⅙ serving[1]	1.1	100	5.8	.022	.129	.0012	282	9	8	35
Sauerkraut	2½ cups packed	13.0	100	6.3	.148	.037	.0122	+	+	740	+
Scallops	15-20 scallops	4.8	100	22.0	.113	.037	.0030		+		
Shrimp, canned without oil	20 shrimps or ⅗ cup	3.2	100	22.7	.086	.154	.0013	+	+		+
Smelts, whole	2 fish 6″ long	7.1	100	20.3	.022	.233	.0012	+	+	–	+
Snow pudding	⅜ cup	2.2	100	2.1	.002	.001	–	–	–	38	9
Soda water, plain	1 large glass	–	200								
Soda water with chocolate ice cream	1 large glass	–	375								
Soda water with vanilla ice cream	1 large glass	–	325								
Soy bean loaf	2½ tbsp.	1.2	100	7.2	.087	.133	.0010	399	23	83	124
Soy bean loaf	1 cup	7.1	591	42.6	.515	.785	.0059	2360	136	490	735
Soy bean soup	⅜ cup	3.5	100	6.0	.118	.134	.0008	183	20	18	102
Soy bean soup	1 cup	7.5	216	13.0	.255	.290	.0017	396	43	39	221
Soy beans, dried	⅙ cup	1.0	100	11.5	.069	.195	.0020	+	73	–	262
Spanish cream	½ cup	2.5	100	3.9	.069	.073	.0004	235	6	7	32
Spinach à la crême	⅗ cup	4.1	100	2.9	.011	.066	.0032	14148	36	555	126
Spinach à la crême	1 cup	6.8	165	4.8	.018	.109	.0053	23400	60	915	208
Spinach, cooked and chopped	2½ cups	14.8	100	8.8	–	.192	.0107	46398	122	1850	418
Spinach, cooked and chopped	1 cup	5.9	40	3.5	–	.077	.0043	18560	49	740	167
Spinach soup, cream of	⅔ cup	4.2	100	3.7	.116	.102	.0006	2087	15	96	48
Spinach soup, cream of	1 cup	7.6	179	6.6	.208	.183	.0011	3740	27	172	86
Spinach with egg	⅘ cup	7.6	100	5.3	.012	.103	.0039	15255	44	590	161
Sponge cake, 6-egg	Piece 1½″ x 1½″ x 2″	0.9	100	3.0	.014	.035	.0006	250	5		24
Sponge cake, hot water	Piece 2″ x 2¾″ x ⅞″	0.9	100	1.7	.007	.023	.0003	100	2	50	10
Squash, Hubbard, cooked	1 cup (scant)	8.1	100	3.4	.043	.064	.0013	8603	+		

[1] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Squash pie	Piece 2" at circumference	1.8	100	2.6	.058	.054	.0008	1053	3	6	19
Squash pie	Piece 4½" at circumference	4.1	225	5.8	.131	.122	.0018	2375	7	14	43
Squash, summer	⅔ squash 5" diam.	18.7	100	3.2	.095	.085	.0019	1191			
Strawberries, fresh	1⅓ cups	9.0	100	2.6	.087	.072	.0017	170	2	1280	
Stuffing	⅙ cup	0.9	100	2.4	.010	.024	.0002	141	–	–	–
Succotash, canned	⅓ cup	3.6	100	4.6	.014	.104	.0012		30	170	40
Suet	1 cup	3.5	749	–	–	–	–	–	–	–	–
Sugar, brown	3 tbsp.	0.9	100	–	.023	.003	.0007	–	–	–	–
Sugar, brown	1 cup	5.8	625	–	.144	.019	.0044	–	–	–	–
Sugar cookies	2 cookies, 2¼" diam.	0.9	100	1.4	.004	.017	.0001	129	–	–	2
Sugar, granulated	2 tbsp. (scant)	0.9	100	–	–	–	–	–	–	–	–
Sugar, granulated	1 cup	7.4	840	–	–	–	–	–	–	–	–
Sugar, loaf	4 pieces 1⅛" x ¾" x ⅜"	0.9	100	–	–	–	–	–	–	–	–
Sugar, powdered	2¾ tbsp.	0.9	100	–	–	–	–	–	–	–	–
Sugar, powdered	1 cup	6.0	680	–	–	–	–	–	–	–	–
Sundae, chocolate, chocolate and walnut sauce	1 sundae	–	425								
Sundae, chocolate ice cream with maple walnut sauce	1 sundae	–	419								
Sundae, fruit ice cream with fruit sauce	1 sundae	–	250								
Sundae, vanilla ice cream with chocolate sauce	1 sundae	–	396								
Sundae, vanilla ice cream, walnut marshmallow sauce	1 sundae	–	350								
Sweetbreads	1 pair, medium size	8.0	400	52.4	.032	1.380	.0037				
Swiss chard with mayonnaise	1 serving[1]	3.5	100	3.0	.200	.150	.0062	25800	+	–	+

[1] For servings consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Swiss steak, see Beef											
Tapioca	2 tbsp.	1.0	100	0.1	.005	.002	.0005	–	–	–	–
Tapioca	1 cup	6.5	653	0.7	.033	.013	.0033	–	–	–	–
Tapioca cornmeal pudding	¼ cup	1.8	100	2.7	.103	.074	.0006	80	5	10	24
Tapioca cornmeal pudding	1 cup	6.0	396	10.7	.409	.294	.0024	318	20	40	95
Tapioca cream	⅖ cup	2.8	100	2.9	.080	.073	.0005	192	6	14	29
Tapioca cream	1 cup	7.3	255	7.4	.204	.186	.0013	490	15	36	74
Toast, cream	⅔ slice toast, ⅛ cup sauce	2.2	100	3.2	.065	.065	.0002	163	3	7	17
Toast, cream	1 slice toast and ⅛ cup sauce	3.5	160	5.1	.104	.104	.0003	261	5	11	27
Toast, French	Slice 3″ x 3″ x ½″	1.4	100	3.0	.032	.045	.0002	250	2	4	13
Tomato and cucumber salad	⅝ serving[1]	2.0	100	1.2	.016	.037	.0005	263	11	276	16
Tomato and cucumber salad with mineral oil dressing	1 serving[1]	8.0	45	2.5	.030	.071	.0010	486	25	726	27
Tomato and lettuce salad	½ serving[1]	2.7	100	0.9	.009	.027	.0003	304	12	175	17
Tomato and lettuce salad with mineral oil dressing	1 serving[1]	5.5	30	1.6	.016	.043	.0006	455	26	365	29
Tomato jelly salad	1¼ cups	12.7	100	8.2	.032	.075	.0012	1325	63	1470	47
Tomato sauce	⅓ cup	2.5	100	1.5	.014	.026	.0004	528	8	380	13
Tomato soup, clear	1 cup (scant)	7.4	100	1.8	.014	.031	.0005	600	12	500	16
Tomato soup, cream of	⅜ cup	3.2	100	2.8	.087	.075	.0004	382	11	190	45
Tomato soup, cream of	1 cup	8.7	269	7.5	.234	.202	.0011	1030	30	512	121
Tomatoes, canned	2 cups	17.1	100	5.8	.048	.138	.0022	2857	85	1700	97
Tomatoes, fresh, whole	2–3 medium	17.1	100	5.8	.048	.138	.0022	2857	85	1700	97
Tomatoes, scalloped	⅝ cup	4.8	100	2.3	.021	.048	.0007	753	30	710	23

[1] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Tomatoes, stuffed with liver	½ tomato	3.5	100	10.5	.016	.198	.0041	3912	37	266	431
Tomatoes, stuffed	1 tomato	4.0	100	4.5	.015	.066	.0008	841	21	425	24
Triscuit	6 triscuits, 2" square	1.0	100	3.3	.011	.089	.0012	3	13		22
Tuna fish à la Newburg	¼ cup (scant)	1.8	100	9.0	.030	.124	.0007	220[1]	2[1]	8	12[1]
Tuna fish, canned	½ cup	2.8	100	17.6	.019	.201	.0010	+	+	–	+
Turkey, dark meat, cooked	1 slice 4" x 2½" x ¼"	1.8	100	20.1	.012	.216	.0030	+	+	–	+
Turkey, light meat, cooked	1 slice 4" x 2¼" x ¼"	1.9	100	19.0	.011	.204	.0029	+	+	–	+
Turkey, roast, stuffing	⅙ cup	0.8	100	2.3	.001	.024	.0003	+		–	+
Turkish pilaf	1 cup	7.5	100	2.3	.012	.040	.0006	463	20	460	15
Turnip greens, boiled	1⅔ cups	9.6	100	7.9	.943	.133	.0095	14250	81	660	816
Turnip greens, boiled	1 cup	5.9	60	4.7	.566	.053	.0057	8550	49	390	490
Turnip greens, creamed	⅗ cup	4.5	100	3.4	.236	.072	.0019	2937	18	135	170
Turnip greens, creamed	1 cup	7.7	173	5.9	.408	.125	.0033	5080	31	233	294
Turnip greens, with oil dressing	⅗ cup	2.9	100	1.5	.179	.025	.0018	2715	15	132	155
Turnip greens, with oil dressing	1 cup	4.9	169	2.5	.302	.042	.0030	4570	25	223	262
Turnips, cooked	2 cups of ½" cubes	10.2	100	3.5	.173	.136	.0015		33	570	114
Turnips, creamed	½ cup	2.9	100	2.5	.101	.082	.0006	165	15	375	56
Veal cutlets, breaded	⅖ serving[2]	2.0	100	7.6	.009	.086	.0010	177	1		68
Veal kidney	1 kidney, 4¾" long	7.0	250	33.8	.020	.363	.0083	1207	88	–	1600
Veal kidney	⅖ of kidney 4¾" long	2.8	100	13.5	.008	.145	.0033	483	35	–	640
Veal, leg, roast, lean	Slice 2" x 2¾" x ⅛"	2.3	100	17.5	.011	.179	.0021	–	+	–	123
Veal liver, uncooked	Slice 3½" x 2½" x ½"	2.9	100	15.8	.009	.286	.0064	5820	39	+	694
Veal liver, pan broiled	Slice 3½" x 2½" x ⅜"	2.1	100	15.8	.009	.286	.0064	5820	31		694

[1] Values for sauce only; those for tuna fish not known.
[2] For serving consult Table II, Dietary Recipes.

TABLE I.—NUTRITIVE VALUES OF FOODS (*Continued*)

Material	Measure	Weight Ounces	Total Calories	Protein Grams	Calcium Grams	Phosphorus Grams	Iron Grams	Vitamins A I. U.	Vitamins B_1 I. U.	Vitamins C I. U.	Vitamins G S. U.
Vegetable soup	⅞ cup	8.1	100	2.0	.041	.059	.0012	432	3	90	30
Waffles	1 waffle, 6″ diam.	2.3	250	9.0	.073	.137	.0010	585	10	10	53
Waffles	⅖ of waffle, 6″ diam.	0.9	100	3.6	.029	.055	.0004	234	4	4	21
Waldorf salad	⅖ serving[1]	1.2	100	0.8	.014	.024	.0002	30	9	40	7
Waldorf salad	1 serving[1]	3.0	250	2.0	.035	.060	.0005	75	22	100	18
Walnuts, English	8–16 meats or 1¼ tbsp. chopped	0.5	100	2.6	.013	.051	.0003	+	22	–	
Walnuts, English	1 cup chopped	3.0	600	15.7	.078	.306	.0018	+	129	–	
Watercress	5 bunches, 3″ long, 3″ diam.	15.9	100	7.7	.714	.209	.0135	2723	137	4550	455
Watermelon	¾″ slice, 6″ diam.	11.7	100	1.3	.027	.043	.0008	225	28	460	41
Welsh rarebit	1½ tbsp. sauce, ½ slice toast	1.3	100	5.5	.136	.119	.0004	376	1	1	37
Welsh rarebit	¼ cup sauce, 1 slice toast	2.7	210	11.5	.286	.250	.0008	790	2	2	78
Wheat germ	⅗ cup (flaked)	0.9	100	6.8	.018	.260	.0019	+	300	–	75
Wheat, puffed	2 cups	1.0	100	4.3	.011	.112	.0011	+	–	–	+
Wheat shredded	1 biscuit	1.0	100	3.3	.011	.089	.0012	3	13	–	22
Whey	1 cup	8.0	60	2.2	.099	.079					
Whey	1⅔ cups	13.0	100	3.7	.165	.131					
White mountain icing	2½ tbsp.	1.0	100	0.4	–	–	–	–	–	–	3
White sauce, medium thick	¼ cup	2.4	100	2.9	.069	.057	.0002	243	4	20	45
Yeast, compressed	1 cake	0.6	20	1.7					27		177
Yeast, compressed	5 cakes	3.0	100	8.7					133		883
Zwieback	3 pieces 3¼″ x 1¼″ x ½″	0.8	100	2.2	.023	.035	.0003				

[1] For servings consult Table II, Dietary Recipes.

TABLE II

Dietary Recipes

INTRODUCTORY NOTE

Since a great deal of variation in nutritive value is possible in the same dish, according to the recipe used, it has seemed desirable to indicate the ingredients of the dishes whose food values have been given in Table I. Here are included almost all the combinations of food materials used in preparation of the dietaries given throughout the book, as well as a number of other dishes with which any cook is likely to be familiar. The ingredients of each recipe have been measured and weighed separately, their food values calculated on these weights, and then added together to give the food value of the whole recipe. Each dish has then been cooked and when ready to eat measured and weighed. From the weight and total calories of the cooked product the 100-calorie portion has in each case been estimated, then weighed out and measured as accurately as possible with ordinary kitchen equipment, *i.e.* half-pint cups divided into quarters and thirds, tablespoons and teaspoons, supplemented by an ordinary foot rule. From the scientific point of view such a method is very crude. No two people *measuring* flour for a cake will get exactly the same *weight*. Then, too, the finished cake will vary in weight according to these differences in weight of ingredients and also according to the size and shape of the pan, the intensity of the oven heat, and the length of time of baking. Furthermore, it is not possible to measure the cubical contents exactly with a ruler, as few cakes are perfectly flat on top and, also, a sample cut from the soft center may weigh the same as one from a hardened corner, but the measurements will not agree exactly. For such reasons, data on cooked food materials, unless prepared by the methods of the chemical laboratory instead of the kitchen, must be regarded as approximate rather than absolutely accurate. To any one intent on learning to estimate food values for practical household purposes, these discrepancies are of no moment. A variation of a few calories in a day's dietary has no particular significance. What one needs to know is the *approximate* food value of any dish which is prepared. One can then estimate the food value of each individual serving without difficulty. The calorie values for the whole recipe have been stated first, followed usually by those for some convenient smaller unit of measure. If anyone will take the trouble to measure a 100-calorie portion, it will

be found possible to remember this well enough to judge of the approximate calorie value of any portion served. For example, 100 calories of mince pie require a sector one inch on the outer circumference; a 9-inch pie is about 28 inches in circumference, and hence will yield about 2800 calories; if each serving is three inches on the outer edge, it will contain 300 calories—if four inches, 400 calories, etc. The mineral and vitamin values may be found from the values given in Table I.

The recipes are drawn from many sources—standard cookbooks or contributions from students in the author's laboratory—and it is believed that they represent the common way of making most of the dishes, though a few have been specially arranged for economy's sake. In the latter case, the more usual way has sometimes been given in a second recipe. No attempt has been made to keep them uniform for any particular number of servings. The aim has been merely to indicate proportions of ingredients, so that the housewife can compare these recipes with her own and where they are alike multiply or divide the values of each according to the size of her family. As this book is not intended as a substitute for a cookbook, the kind and quantity of seasonings have not been given, these having no appreciable food value.

TABLE II.—DIETARY RECIPES

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
Angel Cake						
1 cup sugar						
¾ cup flour						
Whites 8 eggs	Loaf 2½" x 5½"					
1 tsp. vanilla	x 5½"	14.0	1260	156	12	1092
1 tsp. cream of	Piece 1¼" x 2"					
tartar	x 2½"	1.3	100	12	1	87
Apple and Carrot Salad						
1 cup shredded raw apple						
1 cup shredded raw carrot	4 servings	13.0	444	13	302	129
4 lettuce leaves	1 serving	2.9	100	3	68	29
3 tbsp. mayonnaise						
Apple, Baked						
1 large apple						
2 tbsp. sugar						
1 tbsp. water	1 serving	4.5	200	3	5	192
Apple, Baked, with Whipped Cream						
1 large apple						
1 tbsp. sugar						
1 tbsp. water						
1 tbsp. cream	1 apple	4.8	200	3	61	136
Apple Pie						
4 apples						
½ cup sugar						
Water	Pie 9" diam.	28.0	1830	64	744	1022
Pastry for 2	Piece 4½" at					
crusts	circumference	4.8	300	9	123	168
Apple Sauce						
4 large apples						
6½ tbsp. sugar	2½ cups	23.0	671	9	26	636
Water	1 cup	9.2	268	4	10	254
Apple Sauce Cake						
1 cup sugar						
2 tbsp. butter						
1 cup apple sauce						
2 cups flour	Loaf 5¾" x 8"					
1 tsp. soda	x 1½"	21.2	2474	116	281	2077
⅔ cup raisins	Piece 1½" x ½"					
Spices	x 3¾"	0.8	100	5	11	84

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
APPLE SNOW						
3 egg whites						
¾ cup steamed apple pulp						
½ cup sugar	5¾ cups	15.7	762	48	18	696
APPLE TAPIOCA						
½ cup tapioca						
4 apples						
½ cup sugar						
3 cups water						
Few grains salt	4⅔ cups	34.5	950	6	12	932
APRICOTS, STEWED, DRIED						
1 lb. apricots						
1 cup sugar	5¼ cups	56.4	2100	85	41	1974
Water	1 cup	10.7	400	16	8	376
ASPARAGUS, AU GRATIN						
20 canned asparagus tips 3″ long						
1½ tbsp. cheese						
½ slice bread						
½ tbsp. butter						
Seasoning	1 cup	5.9	200	40	115	45
ASPARAGUS, CREAMED						
20 asparagus tips						
1 tbsp. butter						
1 tbsp. flour						
½ cup milk	1 cup	7.0	268	39	152	77
ASPARAGUS, ON TOAST						
1 can (20 stalks) asparagus						
4 slices toast	4 servings	30.8	678	92	309	277
1 cup white sauce	1 serving	7.7	169	23	77	69
ASPARAGUS SOUP, CREAM OF						
1 can asparagus						
1 bouillon cube						
4 cups milk						
4 tbsp. butter						
5 tbsp. flour						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
ASPARAGUS SOUP, CREAM OF—*Continued*						
2 eggs	2 qts.	60.0	1510	250	845	415
Seasonings	1 cup	7.5	189	31	106	52
AVOCADO DESSERT						
½ small avocado						
1 tbsp. powdered sugar						
½ tsp. lemon juice	1 serving	2.4	149	5	108	36
AVOCADO ON THE HALF SHELL						
½ large avocado pear						
1 tsp. olive oil						
1 tbsp. lemon juice	1 serving	6.4	456	12	394	50
AVOCADO SALAD						
½ cup avocado cubes						
2 lettuce leaves						
1½ tsp. olive oil						
½ tsp. lemon juice	1 serving	3.0	170	5	148	17
BAKING POWDER BISCUIT						
2 cups flour						
4 tsp. baking powder						
1 tsp. salt						
1 tsp. lard						
1 tbsp. butter	24 small biscuits	14.8	1182	128	319	735
¾ cup milk	1 biscuit	0.7	50	5	14	31
BANANA AND LETTUCE SALAD						
¼ banana						
1 lettuce leaf						
1 tbsp. orange juice	1 serving	1.8	33	1	1	31
BANANA JELLY						
1 tbsp. gelatin						
⅜ cup sugar	Piece 6″ x 4″					
¾ cup banana	x 1¼″	16.0	418	37	6	375
1 tbsp. lemon juice	Piece 3″ x 2″					
2 cups water	x 1″	3.8	100	9	1	90
BANANA NUT SALAD						
1 tbsp. walnuts						
½ banana						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
BANANA NUT SALAD—*Continued*						
1 lettuce leaf						
1 tbsp. mayonnaise	1 serving	4.4	261	15	175	71
BANANA SALAD						
4 bananas						
1 tbsp. lemon juice						
8 lettuce leaves						
½ cup chopped peanuts						
¼ cup boiled dressing	8 servings	23.2	881	105	317	459
	1 serving	2.9	110	13	40	57
BAKED BEAN SOUP, CREAM OF						
2 tbsp. butter						
4 tbsp. flour						
1 cup milk						
1½ cups bean pulp						
1 cup water						
1 cup strained tomato	5 cups	39.9	964	149	439	375
Seasonings	1 cup	8.0	193	30	88	75
BEAN STEW, KIDNEY						
½ cup kidney beans						
½ onion						
1 tbsp. rice						
2 small potatoes						
2 cups canned tomatoes						
1 tbsp. butter	3¾ cups	36.0	730	189	130	411
Seasonings	1 cup	9.6	195	50	35	110
BEANS, LIMA, BAKED						
2 cups dried Lima beans						
2″ cube fat salt pork						
1 small onion, cut fine	6 cups (round pan 8″ diam., 4″ deep)					
½ cup carrot cubes		42.0	1760	233	693	834
2 tbsp. butter	1 cup	7.0	293	39	115	139
BEANS, LIMA, BUTTERED						
1 cup beans						
1 tbsp. butter	1 cup	6.9	396	61	146	189

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
BEANS, STRING, BUTTERED						
2¼ cups string beans 1″ pieces						
1 tbsp. butter	2⅓ cups	10.0	200	23	106	71
½ tsp. salt	1 cup	4.3	86	10	46	30
BEANS, STRING, CREAMED						
1 cup string beans 1″ pieces						
⅜ cup milk						
2 tsp. butter						
2 tsp. flour	1 cup	6.8	193	25	104	64
¼ tsp. salt						
BEEF, DRIED, CREAMED I						
½ oz. dried beef (slice 4″ x 5″)						
1 tbsp. beef drippings						
1 tbsp. flour						
⅝ cup milk	¾ cup	6.0	250	40	162	48
Seasonings	1 cup	8.0	333	53	216	64
BEEF, DRIED, CREAMED II						
½ cup (2 oz.) dried beef						
1 cup milk						
2 tbsp. butter						
2 tbsp. flour	1½ cups	12.0	520	106	322	92
Seasonings	1 cup	8.0	347	71	215	61
BEEF, HAMBURG STEAK WITH GRAVY						
½ cup chopped beef						
1 tbsp. flour						
½ tbsp. butter	2 balls 2″ diam.,					
Onion	¾″ thick	6.8	298	114	155	29
Salt and pepper	4 tbsp. gravy					
BEEF HEART, STUFFED						
1 beef heart (3 lb.)	1 heart and					
9 oz. salt pork	gravy	48.0	4218	940	2810	468

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
BEEF HEART, STUFFED —*Continued*						
6 oz. bread crumbs	Piece 2½″ x					
¼ cup flour	2½″ x ¼″					
Seasonings	and 1 tbsp					
	gravy	1.1	100	21	68	11
BEEF LOAF						
2 lb. lean beef						
1 egg	Loaf 4″ x 6″					
2 tbsp. melted	x 2½″	26.0	1811	719	1092	—
butter	Piece 4″ x 6″					
Seasonings	x ⅛″	1.4	100	40	60	—
BEEF, ROUND STEAK, STUFFED						
2 lb. lean steak	Roll 6″ or 7″					
2 oz. suet	long, 3″ diam.	36.0	2107	800	1051	256
4 oz. bread crumbs	Piece 3″ diam.,					
Seasonings	½″ thick	1.7	100	39	49	12
BEEF, SIRLOIN STEAK						
Piece of steak 4″ x 2″ x ¾″						
½ tbsp. butter	1 serving	5.6	398	108	290	—
BEEF STEW WITH VEGETABLES						
½ lb. beef plate						
½ cup carrot cubes						
1 onion						
3 potatoes						
½ cup turnip cubes						
¼ cup flour						
Water and season-	4¾ cups	34.0	1132	183	510	439
ings	1 cup	7.2	238	39	107	92
BEEF, SWISS STEAK						
1 lb. lean beef round						
½ cup flour						
2 tbsp. drippings	Piece 4½″ x 7″					
1 slice onion	x 1″	15.0	1215	418	585	212
1 tbsp. vinegar	Piece 4″ x 1″					
Seasonings	x ⅝″	1.2	100	35	48	17
BLUEBERRY PIE						
3 cups blueberries						
1 tbsp. butter						
1 tbsp. cornstarch						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
BLUEBERRY PIE—*Continued*						
⅔ cup sugar (scant)	Pie 9″ diam.	30.0	2140	84	742	1314
¼ tsp. salt	Piece 4½″ at circumference					
Pastry for crust		4.8	340	13	119	208
BRAN MUFFINS						
1 cup flour						
1 tsp. soda						
2 cups bran						
1 tsp. salt						
1¼ cups milk	12 muffins, 2¾″					
½ cup molasses	diam.	24.0	1382	271	236	875
1 egg	1 muffin	2.0	115	23	20	72
BRAN AND WHEAT GERM MUFFINS						
½ cup flour						
1½ tsp. baking powder						
¼ tsp. salt						
1 cup bran						
¼ cup wheat germ						
2½ tbsp. molasses	6 muffins, 2¾″					
1 egg	diam.	9.1	674	118	83	473
½ cup milk	1 muffin	1.5	114	20	14	80
BROWN BETTY						
2 cups bread crumbs						
4 tbsp. butter						
3 large apples						
½ cup sugar	2½ cups	25.5	1240	44	434	762
1 cup water	1 cup	10.2	500	18	175	307
BROWN SAUCE						
2 tbsp. butter						
½ slice onion						
3 tbsp. flour						
1 cup brown stock	1⅙ cups	7.8	228	32	112	84
Seasonings	1 cup	6.7	195	27	96	72
BROWN SUGAR SAUCE						
½ cup brown sugar						
½ tbsp. cornstarch						
1 cup water						
1 tsp. vinegar	1 cup (very full)	9.9	330	—	—	330

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
CABBAGE AND APPLE SALAD						
1 cup chopped cabbage						
½ large apple						
2 tbsp. mayonnaise	3 servings	10.6	297	14	203	80
3 lettuce leaves	1 serving	3.2	100	5	68	27
CABBAGE, BUTTERED						
1¾ cups cabbage	¾ cup	5.8	100	10	54	36
½ tbsp. butter	1 cup	7.7	133	13	72	48
CABBAGE, ESCALLOPED						
2½ cups cabbage						
1 cup white sauce						
2 tbsp. cheese						
2 tbsp. bread crumbs	2 cups	14.7	600	72	396	132
1 tsp. butter	⅜ cup	2.4	100	12	66	22
CABBAGE SALAD						
¾ cup cabbage						
1 tbsp. French dressing	¾ cup	2.8	100	4	82	14
CAKE, TWO EGG[1]						
½ cup butter						
1 cup sugar						
2 eggs	2 layers,					
½ cup milk	9″ diam.,					
2 cups flour	1″ thick	22.1	2727	164	1010	1553
3 tsp. baking powder	Piece, 2″ x 2¼″ x 1″	4.6	100	6	37	57
CARAMEL PUDDING						
2 cups milk						
5 tbsp. cornstarch						
½ cup sugar						
¼ cup water	6 servings	24.2	900	64	177	659
1 tsp. vanilla	1 serving	6.0	150	10	29	111
Salt						
CARROT AND ORANGE SALAD						
⅜ cup grated carrot						
2 slices orange, ½″ thick, 2″ diam.						
3 lettuce leaves						

[1] For other cakes see *Angel*, *Chocolate*, *Fruit*, etc.

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
CARROT AND ORANGE SALAD—*Continued*						
2 tbsp. orange juice						
2 tsp. mayonnaise						
⅛ tsp. salt	1 serving	8.0	175	9	89	77
CARROTS, BUTTERED						
2 cups carrots	1¾ cups	10.6	351	13	235	103
2 tbsp. butter	1 cup	6.1	200	7	134	59
CARROTS, CREAMED						
2 cups carrots						
¾ tbsp. butter						
¾ tbsp. flour	2½ cups	14.8	330	36	144	150
⅔ cup milk	1 cup	5.9	131	14	57	60
CARROT SANDWICH						
2 slices whole wheat bread 3¾" x 3" x ¼"						
1 tsp. butter						
3 tbsp. raw grated carrot						
1 tbsp. orange juice	1 sandwich	3.4	127	13	40	74
CELERY SOUP, CREAM OF						
2 bunches celery						
4 tbsp. butter						
6 tbsp. flour						
3 cups milk	5¼ cups	40.0	1097	128	666	303
Seasonings	1 cup	8.4	230	26	140	64
CHARLOTTE RUSSE FILLING						
1 cup thick cream						
½ cup skim milk						
½ tsp. gelatin						
¼ cup sugar	2½ cups	17.2	1177	44	879	254
4 tbsp. water	1 cup	6.9	471	18	351	102
CHEESE AND OLIVE SANDWICH						
1 tbsp. mayonnaise						
2 tbsp. cheese						
2 olives, chopped						
2 slices white bread 3½" x 3" x ½"	1 sandwich	3.8	426	54	260	112

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
Cheese and Pineapple Salad ½ head lettuce 6 slices canned pineapple 1 cream cheese 6 tbsp. French dressing	6 servings 1 serving	22.4 3.7	1315 219	79 13	906 151	328 55
Cheese Fondue 1¼ cups grated cheese 1 cup milk 1 tbsp. butter 1 cup soft bread crumbs 3 eggs	Round pan 1" deep, 7" diam. Piece 1" x 2¼" x 3¼"	15.8 3.0	1053 200	247 46	681 130	125 24
Cheese Sauce 1½ tbsp. butter 1½ tbsp. flour 1 cup milk ¼ cup grated cheese	1¼ cups 1 cup	10.5 8.4	492 393	73 58	338 270	81 65
Cheese Soufflé 2 tbsp. butter 3 tbsp. flour ½ cup milk ¼ cup cheese 3 eggs Seasonings	3 cups 1 cup	11.5 3.8	661 220	119 40	467 155	75 25
Cheese Straws 1 tbsp. butter ⅔ cup flour 1 cup bread crumbs 2 tbsp. milk 1 cup grated cheese Seasonings	28 straws 5" x ⅜" x ⅜" 1 straw	8.0 0.3	1050 38	182	542 19	326 12
Cheese, Toasted Saltines 6 saltines 2 tbsp. cheese	6 crackers	1.1	172	28	79	65
Chicken, Creamed ½ cup canned chicken 1 tbsp butter 1 tbsp. flour ½ cup milk	1 cup	7.2	435	72	315	48

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbohydrate
CHICKEN SALAD						
1 cup cooked chicken						
1 cup celery						
8 lettuce leaves						
4 tbsp. French dressing						
4 tbsp. mayonnaise	8 servings	14.1	915	174	686	55
dressing	1 serving	1.8	114	22	85	
CHOCOLATE I						
½ cup milk						
½ cup water						
½ sq. chocolate						
1 tbsp. sugar	1 cup	9.0	223	23	106	94
CHOCOLATE II						
1 cup milk						
½ sq. chocolate						
1 tbsp. sugar	1 cup	9.3	306	39	150	117
CHOCOLATE BLANC MANGE						
3 tbsp. cornstarch						
2 cups milk						
½ cup sugar						
1½ sq. chocolate	2½ cups	21.2	1077	88	362	627
½ tsp. vanilla	1 cup	8.5	431	35	145	251
CHOCOLATE DROP COOKIES						
½ cup butter						
1 cup brown sugar						
½ cup milk						
2 cups flour						
2 eggs						
3 sq. chocolate						
1 cup nut meats	56 cookies 2¼"					
2 tsp. soda	diam.	32.0	3760	292	1980	1488
2 tsp. vanilla	1 cooky	0.6	63	5	35	23
CHOCOLATE FUDGE						
2 cups sugar						
⅔ cup milk	Sheet 6" x 4" x					
1 tbsp. butter	1"	20.6	2244	56	444	1744
2 sq. chocolate	Piece 1½" x 1"					
1 tsp. vanilla	x ¾"	0.9	100	2	20	78

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
CHOCOLATE LOAF CAKE ½ cup butter 1 cup sugar 2 eggs ½ cup milk 1½ cups flour 2½ tsp. baking powder	Loaf 5½″ x 10½″ x 2½″	28.0	3070	165	1252	1653
2 sq. chocolate	Piece 2½″ x 2½″ x ⅞″	0.9	100	5	41	54
CHOCOLATE NUT CARAMELS ¾ cup condensed milk ¾ cup cream 2 cups sugar ¾ cup glucose 2 sq. chocolate ½ cup English walnuts	Sheet 8″ x 4″ x 1″	26.0	3892	173	1260	2459
½ cup almonds	Piece 1″ x 1″ x ⅘″	0.7	100	4	32	64
CHOCOLATE NUT FUDGE 2 cups sugar ¾ cup milk 2 tbsp. butter 2 sq. chocolate ½ tsp. vanilla ¾ cup chopped walnuts ⅛ tsp. salt	Square 5″ x 6″ x 1″	28.4	3133	122	1060	1951
CLUB SANDWICH 2 slices toast 2 slices cooked bacon 2 large leaves lettuce 3 tbsp. chopped chicken 3 tbsp. mayonnaise dressing 4 olives 2 slices tomato ½ egg	1 sandwich	9.0	609	91	417	101

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
Cocoa I						
½ cup milk						
½ cup water						
2 tsp. cocoa						
2 tsp. sugar	1 cup	9.0	161	22	63	76
Cocoa II						
1 cup milk						
2 tsp. cocoa						
2 tsp. sugar	1 cup	9.0	240	38	107	95
Cocoa III						
1 cup milk						
2 tsp. cocoa						
3 tbsp. lactose	1 cup	9.2	320	39	107	174
Cocoa IV						
4 tbsp. dried whole milk						
2 tsp. cocoa						
2 tsp. sugar						
1 cup water	1 cup	8.5	217	36	93	88
Cocoa V						
½ cup evaporated milk						
½ cup water						
2 tsp. cocoa						
2 tsp. sugar	1 cup	8.0	223	37	98	88
Cocoa Tapioca						
⅔ cup milk						
2 tbsp. tapioca						
2 tsp. cocoa	¾ cup	7.0	324	28	78	218
4 tsp. sugar	1 cup	9.3	432	37	104	291
Coconut Caramels						
1 cup condensed milk						
½ cup cream						
½ cup maple syrup	Sheet 8″ x 4″					
2 cups sugar	x 1″	26.0	3735	118	881	2736
⅔ cup glucose	1 caramel, ¾″					
1 cup coconut	cube	0.4	50	1	12	37
Coconut Custard Pie						
1 cup coconut	Pie 9″ diam.	48.9	2839	312	1277	1250
3 cups milk	Piece 4½″ at	8.1	475	52	214	209
6 eggs	circumfer-					
¾ cup sugar	ence					

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
COCONUT CUSTARD PIE—*Continued*						
Pastry for under-crust						
CODFISH BALLS						
1 cup codfish						
2 cups potato						
2 tbsp. butter	10 balls 2"					
1 egg	diam.	16.6	980	138	632	210
Fat for frying	1 ball	1.7	100	14	65	21
CODFISH, CREAMED						
2 cups salt cod (shredded)						
1 cup skim milk						
1 cup water						
3 tbsp. butter	4 cups	18.4	747	243	343	161
4 tbsp. flour	1 cup	4.6	187	61	86	40
COFFEE JELLY						
2 tbsp. gelatin						
½ cup cold water						
1 cup boiling water						
2 cups boiled coffee	4 cups	31.0	352	72	—	280
⅓ cup sugar	1 cup	8.0	88	18	—	70
COLE SLAW						
2 cups shredded cabbage						
¼ cup thick cream						
1½ tbsp. vinegar	2½ cups	7.2	259	15	202	42
Seasonings	1 cup	2.8	100	6	78	16
COLE SLAW WITH PEPPER						
2 cups shredded cabbage						
½ green pepper						
¼ cup thin cream	2½ cups	8.1	168	17	98	53
1½ tbsp. vinegar	1 cup	3.2	67	7	39	21
COOKIES, PLAIN[1]						
½ cup butter						
1 cup sugar						
1 egg						
¼ cup milk						
2 tsp. baking	60 cookies 2¼"					
powder	diam.	26.0	2911	166	957	1788
2½ cups flour	1 cooky	0.5	50	3	17	30

[1] For other cookies see *Chocolate, Hermits, Molasses, Oatmeal, Peanut.*

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
CORN À LA SOUTHERN						
1 cup canned corn						
1 egg						
¾ tbsp. butter						
1 cup milk	2 cups	20.8	590	95	243	252
Seasonings	1 cup	10.4	295	47	122	126
CORN BREAD, OLD NEW ENGLAND						
2 cups cornmeal	Loaf 1″ x 6″					
1 cup flour	x 8½″	20.0	2000	160	590	1250
⅔ cup suet	Piece 2½″ x 1″					
⅓ cup molasses	x 1″	1.0	100	8	30	62
CORN CAKE (*Johnny cake*)						
¾ cup cornmeal						
1¼ cups flour						
¼ cup sugar						
5 tsp. baking powder						
½ tsp. salt	Loaf 6″ x 10″					
1 cup milk	x 1″	18.0	1538	162	364	1012
1 egg	Piece 2″ x 2″					
2 tbsp. butter	x 1″	1.2	100	10	24	66
CORN CHOWDER						
1 cup canned corn						
2 cups potatoes						
8 soda crackers						
2 cups milk						
1½ tbsp. butter						
1½ oz. salt pork	5 cups	41.7	1244	144	540	560
Seasonings	1 cup	8.3	250	29	109	112
CORN MUFFINS						
½ cup cornmeal						
1 cup flour						
3 tsp. baking powder						
1 tbsp. sugar						
1 tbsp. melted butter						
½ tsp. salt	8 muffins, 2¾″					
¾ cup milk	diam.	13.0	1100	143	271	686
1 egg	1 muffin	1.6	133	17	33	83
CORN SOUP, CREAM OF						
2 cups canned corn						
2 cups milk						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
CORN SOUP, CREAM OF—*Continued*						
2 tbsp. butter						
2 tbsp. flour						
2 cups water	5¾ cups	44.7	1163	137	439	587
Seasonings	1 cup	7.8	200	24	76	100
CORNSTARCH BLANC MANGE						
4 tbsp. cornstarch						
⅓ cup sugar						
2 cups milk	2 cups	19.5	733	64	176	493
½ tsp. vanilla	1 cup	9.8	367	32	88	247
COTTAGE PUDDING						
¼ cup butter						
¾ cup sugar						
1 egg						
1 cup milk						
2¼ cups flour	2 loaves 6″ x					
4 tsp. baking powder	4″ x 1¾″	24.3	2100	179	549	1372
½ tsp. salt	Piece 1¾″ x 2″ x 2½″	1.1	100	7	26	67
CRANBERRY JELLY						
4 cups cranberries						
1 cup water	3½ cups	30.0	1982	12	41	1929
2 cups sugar	1 cup	8.6	566	3	12	551
CRANBERRY PIE						
2 cups cranberries						
1 cup sugar						
⅓ cup water						
Plain pastry for	Pie 8″ diam.	21.2	1462	28	266	1168
undercrust and strips over top	Piece 5¼″ at circumference	4.2	310	6	64	240
CRANBERRY PUDDING, STEAMED						
⅓ cup butter						
1 cup sugar						
3 eggs						
3½ cups flour	6 cups					
⅓ cup milk	(1½ quart mold)	41.0	3600	347	1178	2075
1½ cups cranberries	1 cup	7.0	600	58	196	346
CRANBERRY SAUCE						
1 cup cranberries						
½ cup sugar	1⅛ cups	8.0	520	2	6	512
½ cup water	1 cup	7.1	462	2	5	455

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
CREAM FILLING I						
¾ cup sugar						
¼ cup flour						
2 eggs						
2 cups milk	2½ cups	22.7	1235	130	293	812
1 tsp. vanilla	1 cup	9.1	494	52	117	325
CREAM FILLING II						
1 cup thick cream						
⅓ cup milk						
1 egg white						
⅓ cup sugar	3 cups	14.6	1170	56	909	205
1 tsp. vanilla	1 cup	4.8	390	19	303	68
CREAM PIE WITH MERINGUE						
2 cups milk						
5 tbsp. flour						
½ cup sugar						
2 eggs						
Flavoring	Pie 9″ diam.	25.8	1597	163	594	840
Pastry for under-crust	Piece 4½″ at circumference	4.1	250	26	94	135
CREAM PUFF SHELLS						
1 cup flour						
½ cup butter						
4 eggs	20 puffs	11.6	1510	158	1017	335
1 cup water	1 puff	0.6	76	8	51	17
CREAM SAUCE						
¾ cup thick cream						
¼ cup skim milk						
⅓ cup powdered sugar	1½ cups	10.0	873	22	595	256
1 tsp. vanilla	1 cup	6.6	582	15	396	171
CROUTONS (FRIED)	80 croutons ½″ cubes					
4 oz. bread		4.2	543	40	264	239
1 oz. fat	10 croutons	0.5	68	5	33	30
CROUTONS (TOASTED)	112 croutons ½″ cubes					
5½ oz. bread		4.4	404	58	16	330
	10 croutons	0.4	37	5	2	30
CUP CAKES, PLAIN						
⅔ cup butter						
2 cups sugar						
4 eggs						
1 cup milk						
3¼ cups flour						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
CUP CAKES, PLAIN—*Continued*	24 cakes					
4 tsp. baking powder	2″ diam. 2″ thick	44.0	4740	385	1560	2795
¼ tsp. mace	1 cake	1.8	200	16	65	119
CUSTARD, BOILED						
2 cups milk						
3 egg yolks						
¼ cup sugar	2 cups	15.0	692	91	303	298
½ tsp. vanilla	1 cup	7.5	346	45	152	149
CUSTARD, CUP						
3 cups milk						
3 eggs	3½ cups	33.8	1030	172	400	458
6 tbsp. sugar	1 cup	9.7	294	49	114	131
CUSTARD PIE						
2 eggs						
3 tbsp. sugar						
2 cups milk	Pie 9″ diam.	22.4	1260	151	580	529
Pastry for under-crust	Piece 4½″ at circumference	3.6	200	24	92	84
DATE AND CREAM CHEESE SANDWICHES						
3 slices bread						
2 tsp. butter	3 triangles 3″					
3 dates	x 3½″ x 4⅗″	3.0	290	27	114	149
1 tbsp. cheese	1 triangle	1.0	97	9	38	50
DATE MUFFINS						
1 cup whole wheat flour						
1 cup white flour						
¼ cup sugar						
1 cup dates						
1 egg						
1 cup milk						
1 tbsp. butter						
3 tsp. baking powder	9 muffins 2¾″ diam.	23.4	1898	181	286	1431
¼ tsp. salt	1 muffin	2.5	200	19	30	151
DATE PUDDING I						
1½ cups dates						
¾ cup white flour						
½ cup whole wheat flour						
½ cup brown sugar						

Table II.—Dietary Recipes (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
Date Pudding I—*Continued*	Loaf 4″ diam., 6″ high	20.0	2486	123	743	1620
⅜ cup drippings ½ tsp. cinnamon	Piece 1″ x 1″ x 1½″	0.8	100	5	30	65
Date Pudding II ¼ cup butter ½ cup molasses ½ cup milk 1 egg 1½ cups whole wheat flour 1 cup dates	2 loaves 3″ diam., 4½″ high	24.3	2111	157	565	1390
½ tsp. soda ½ tsp. salt	Piece 3″ diam., ½″ thick	1.1	100	7	27	66
Date Sandwiches 3 thin slices bread 2 tsp. butter	3 triangles 3″ x 3½″ x 4⅗″	3.4	300	17	81	202
6 dates	1 triangle	1.1	100	6	27	67
Egg and Tomato Salad ½ egg 3 lettuce leaves ½ tomato ½ tbsp. mayonnaise	1 serving	4.4	100	15	73	12
Eggnog ¾ cup milk 1 egg 2 tsp. sugar Flavorings	1 cup	8.5	230	48	110	72
Egg, Poached on Spinach ½ cup spinach 1 egg 1 tsp. butter	1 serving	6.4	124	29	85	10
Egg Salad 2 eggs 4 leaves lettuce 2¾ tbsp. mayonnaise	2 servings	6.6	464	65	395	4
Egg Timbale 1 egg ¾ cup milk Seasonings	¾ cup	7.8	190	49	105	36

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
EGGS À LA GOLDEN-ROD						
2 cups milk						
4 tbsp. flour						
4 tbsp. butter						
8 eggs						
8 slices bread	8 servings	45.3	2287	404	955	928
Seasonings	1 serving	5.7	286	51	119	116
EGGS, SCRAMBLED						
5 eggs						
½ cup milk						
2 tbsp. butter	1½ cups	12.7	584	119	440	25
Seasonings	1 cup	8.5	389	79	293	17
EVAPORATED MILK SAUCE						
1½ cups evaporated milk						
½ cup sugar (scant)	1½ cups	16.8	872	95	250	527
3 tbsp. lemon juice	1 cup	11.2	580	63	167	350
FRENCH SALAD DRESSING						
4 tbsp. olive oil						
2 tbsp. vinegar	6 tbsp.	2.5	400	—	400	—
Seasonings	1 tbsp.	0.4	67	—	67	—
FRUIT BALLS						
1 lb. prunes						
1 lb. raisins						
1 lb. figs						
1¼ lbs. dates						
½ lb. almonds	94 balls	84.0	9470	489	2850	6131
½ lb. pecans	1 ball	0.9	100	5	30	65
FRUIT CAKE						
2 cups shortening						
2⅔ cups brown sugar						
1 cup molasses						
4 sq. cholocate						
12 eggs						
4 cups flour						
1 cup cider						
1 lb. almonds						
2 lbs. seeded raisins						
2 lbs. Sultana raisins						
1½ lbs. citron						
1 lb. currants						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
FRUIT CAKE—*Continued* ½ lemon rind ½ orange rind 1 lb. candied cherries	6 loaves 2″ deep, 6¾″ diam., 1½″ hole in center	14.5 lbs.	24265	1254	8137	14874
	Piece 1⅞″ x 1⅞″ x ⅜″	0.9	100	6	26	68
FRUIT COCKTAIL 1 cup grapefruit sections ½ cup banana cubes ½ cup pineapple cubes ¼ cup sugar ¼ cup water	2 cups	14.1	412	11	10	391
FRUIT PUNCH 1 cup raspberry juice 1⅛ cups currant juice ⅚ cup orange juice ½ cup lemon juice 2⅓ cups sugar	3 qts.	100.4	2727	36	27	2664
6 cups water	1 cup	8.4	227	3	2	222
FRUIT SALAD I ¾ lb. grapes 3 small oranges 1 small banana 24 walnuts	6 cups	36.8	2375	80	1780	515
9 leaves lettuce 1 cup mayonnaise dressing	1 cup and 2 tbsp. dressing	6.1	396	13	297	86
FRUIT SALAD II 3 lettuce leaves 3 sections grape fruit 3 sections orange 1 tbsp. oil ⅓ tbsp. lemon juice Seasonings	1 serving	7.0	200	6	123	71
GINGERBREAD I 1 cup molasses ½ cup water 2¼ cups flour 1 tsp. soda 1½ tsp. ginger	Loaf 8½″ x 9″ x 1″	25.5	2189	143	456	1590

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
GINGERBREAD I—*Continued*						
4 tbsp. melted butter	Piece 1″ x 1⅔″ x 2″	1.1	100	7	21	72
½ tsp. salt						
GINGERBREAD II						
1 cup molasses						
1 cup sour milk						
2⅓ cups flour						
1¾ tsp. soda						
2 tsp. ginger						
½ tsp. salt	Loaf 9½″ x 10″ x 1″	30.0	2407	181	508	1718
¼ cup melted butter	Piece 1″ x 2″ x 2″	1.2	100	8	22	70
GRIDDLE CAKES						
2 cups flour						
1 tbsp. melted butter						
2 cups sour milk						
1 tbsp. sugar						
1 egg						
1 tsp. soda	14 cakes 4½″ diam.	25.0	1358	191	341	826
½ tsp. salt	1 cake	1.8	100	14	25	61
HARD SAUCE						
⅓ cup butter						
⅔ cup powdered sugar						
⅓ tsp. lemon extract	¾ cup	7.4	1103	3	545	555
⅔ tsp. vanilla	1 tbsp.	0.7	100	—	50	50
HASH						
½ cup chopped beef						
⅜ cup chopped potato						
¼ tbsp. butter	¾ cup	6.0	346	120	137	89
Onion	1 cup	8.0	461	160	182	119
HERMITS						
⅓ cup butter						
⅔ cup sugar						
1 egg						
2 tbsp. milk						
1¾ cups flour						
2 tsp. baking powder	50 cookies 2″ diam.	18.5	2116	127	617	1372
⅓ cup raisins	1 cooky	0.4	40	2	12	26

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
ICE CREAM, FRENCH						
2 cups skim milk						
1 tbsp. flour						
1 cup sugar						
1 egg						
1 qt. thin cream	2 qts.	57.7	2874	184	1568	1122
2 tbsp. vanilla	1 cup	7.2	359	23	196	140
ICE CREAM, PHILADELPHIA						
1 qt. thin cream						
¾ cup sugar	1½ qts.	37.2	2390	92	1508	790
1½ tbsp. vanilla	1 cup	6.2	398	15	251	132
IRISH STEW WITH DUMPLINGS						
Stew:						
2 lbs. mutton						
2 lbs. potatoes (4 cups)						
½ lb. carrots (⅔ cup)						
½ lb. turnips (⅔ cup)						
¼ cup flour						
½ small onion						
Seasonings						
Dumplings:						
2 cups flour						
2 cups chopped suet						
¾ cup milk	4 qts. and 16					
4 tsp. baking powder	dumplings	135.0	7057	804	3943	2310
	1 cup and					
½ tsp. salt	1 dumpling	8.4	440	50	246	144
JUNKET						
1 cup milk						
1 tbsp. sugar						
½ junket tablet						
¼ tsp. vanilla	1 cup	9.4	232	34	91	107
KOHLRABI, BUTTERED						
2 cups kohlrabi	2 cups	12.1	325	27	227	71
2¼ tbsp. butter	1 cup	6.1	163	14	114	35
KOHLRABI, CREAMED						
2¼ cups kohlrabi cubes						
1 cup milk						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
KOHLRABI, CREAMED —*Continued*						
1 tbsp. butter						
2 tbsp. flour	2¼ cups	19.9	418	65	191	162
Seasoning	1 cup	8.8	186	29	85	72
LEMONADE						
1 cup water						
1½ tbsp. sugar	1¼ cups	10.0	90	—	—	90
2 tbsp. lemon juice	1 cup	8.0	72	—	—	72
LEMONADE, EGG						
1 egg						
2 tbsp. lemon juice						
2 tbsp. sugar						
⅔ cup water	1 cup	9.0	190	25	45	120
LEMONADE, LACTOSE						
1 tbsp. cane sugar						
2 tbsp. lemon juice						
6 tbsp. lactose						
⅔ cup water	1 cup	8.6	356	—	—	356
LEMON ICE						
1 cup water						
8 tbsp. sugar	1¾ cups	13.5	427	—	—	427
4 tbsp. lemon juice	1 cup	7.7	244	—	—	244
LEMON JELLY						
½ cup sugar						
1 tbsp. gelatin						
¼ cup lemon juice	2 cups	16.8	435	38	—	397
1¾ cups water	1 cup	8.4	218	19	—	199
LEMON MERINGUE PIE						
3 eggs						
1½ cups sugar						
2 tbsp. flour						
3 tbsp. powdered sugar						
2 cups water						
Juice 2 lemons	Pie 9″ diam.	27.0	2700	140	729	1831
Pastry for under-crust	Piece 4½″ at circumference	4.5	450	23	121	306
LEMON MILK SHERBET						
2⅔ cups milk						
1⅓ cups sugar	4⅓ cups	30.8	1574	66	179	1329
⅓ cup lemon juice	1 cup	7.1	363	15	41	307

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
LEMON SAUCE						
½ cup sugar						
1 cup water						
2 tbsp. cornstarch						
2 tbsp. butter						
1½ tbsp. lemon	⅚ cup	10.7	684	1	205	478
juice	1 cup	12.8	821	1	246	574
LENTILS, BAKED						
½ cup dry lentils						
1 tbsp. bread crumbs						
2 tsp. butter						
¼ small onion						
Water						
Seasonings	1 cup	7.0	445	107	86	252
LENTIL MEAT LOAF						
½ lb. round steak						
1 cup cooked lentils						
1 egg						
¼ cup milk						
4 tbsp. butter						
¼ cup chopped walnuts	Loaf 2″ x 3″ x					
¼ cup bread	5″	18.8	1640	460	672	508
crumbs	Piece 1¾″ x					
½ small onion	2½″ x ¾″	1.1	100	28	41	31
LENTIL SOUP						
2 tbsp. lentils (uncooked)						
1½ tbsp. flour						
½ tbsp. butter						
1 tsp. sugar						
½ tsp. salt						
2 cups water	2⅛ cups	18.0	200	34	54	112
Seasonings	1 cup	8.5	95	16	26	53
LENTIL AND TOMATO SOUP						
½ cup lentils (cooked)						
1 cup tomatoes						
¼ tsp. sugar						
¼ tsp. salt						
½ onion						
¼ tsp. lemon rind						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
LENTIL AND TOMATO SOUP—*Continued*						
2 cups water	3 cups	24.2	372	104	12	256
Seasonings	1 cup	8.1	124	35	4	85
LIVER AND NOODLE LOAF						
¼ lb. liver						
¼ cup uncooked vermicelli						
1 egg	Loaf 6″ diam.,					
¼ cup 20% cream	1½″ thick	11.3	525	168	256	101
½ tbsp. butter	Piece 2″ x 2″ x					
¾ tsp. salt	1½″	2.1	100	32	49	19
LIVER SANDWICH I						
2 slices whole wheat bread 3¾″ x 3″ x ⅜″						
1 tsp. butter						
2 tsp. cooked liver						
2 tsp. celery	1 sandwich	2.2	149	24	43	82
LIVER SANDWICH II						
2 slices white bread 3¾″ x 3″ x ⅜″						
1½ tbsp. chopped liver						
¾ tbsp. chopped green olives						
Salt and pepper						
1 tsp. mayonnaise						
Dash onion juice	1 sandwich	1.8	146	22	60	64
MACARONI AND CHEESE						
¾ cup uncooked macaroni						
½ cup grated cheese						
1 tbsp. flour						
1⅓ tbsp. butter						
¾ cup milk						
3 tbsp. bread	4 cups	21.0	1004	170	390	444
crumbs	1 cup	5.3	250	41	98	111
MACARONI CROQUETTES						
1 cup uncooked macaroni						
2½ tbsp. butter						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
MACARONI CROQUETTES—*Cont'd*						
1 cup milk						
1 egg						
⅓ cup flour						
4 tbsp. butter						
1½ cups bread	16 croquettes	25.0	2010	208	898	904
crumbs	1 croquette	1.6	126	13	56	57
MACARONI WITH TOMATO SAUCE						
1 cup macaroni (uncooked)						
1¾ cups tomatoes						
3 tbsp. butter						
3 tbsp. flour	4 cups	33.0	905	97	318	490
Seasonings	1 cup	8.3	226	24	79	123
MARGUERITES						
1 egg white						
2 tbsp. powdered sugar						
12 nuts	8 crackers	3.7	400	43	164	193
8 saltines	1 cracker	0.5	50	5	20	25
MAYONNAISE DRESSING						
1 egg yolk						
1 tsp. sugar						
1 tbsp. lemon juice						
1 tbsp. vinegar						
¾ cup olive oil	1⅛ cups	8.8	1793	12	1740	41
Seasonings	1 cup	7.8	1594	11	1547	36
MEAT PIE						
Pastry:						
1½ cups flour						
⅓ cup crisco						
¼ tsp. baking powder						
1 tsp. salt						
Filling:						
½ lb. beef rump						
5 medium potatoes						
½ lb. carrots (2 large)						
¼ oz. salt pork						
1 small onion						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
MEAT PIE—*Continued*	Pie 9″ diam.,					
3 tbsp. cornstarch	3½″ deep or 8 large servings					
1 tbsp. butter		52.0	3050	320	1314	1416
Seasonings	1 serving	6.5	381	40	164	177
MINCE PIE						
2 lbs. cooked beef						
1 lb. suet						
4 lbs. apples						
2 lbs. raisins						
3 lbs. currants						
3 lbs. sugar						
1 tsp. nutmeg						
½ tsp. mace						
1 tbsp. salt	12 pies, 9″	25.5	34055	2425	11986	19644
2 oranges, juice and	diam.	lbs.				
grated rind	1 pie	24.0	2838	202	999	1637
2 lemons, juice	Piece 4½″ at					
½ lb. citron	circumference					
Pastry for 24 crusts		5.4	450	32	158	260
MOCK HOLLANDAISE SAUCE						
2 tbsp. butter						
2 tbsp. flour						
¾ cup milk						
2 egg yolks						
½ cup butter	1⅓ cups	11.0	1393	57	1255	81
1 tbsp. lemon juice	1 cup	8.3	1045	43	942	60
MOLASSES COOKIES I						
1 cup molasses						
¼ cup lard						
¼ cup oleomargarine						
1 tbsp. ginger						
1 tbsp. soda	73 cookies 2″					
2 tbsp. milk	diam.	17.4	2460	136	820	1504
2 cups bread flour	1 cooky	0.2	33	2	11	20
MOLASSES COOKIES II						
1 cup molasses						
¼ cup butter						
¼ cup lard						
2½ cups flour						
2 tbsp. milk						
1 tbsp. ginger						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
MOLASSES COOKIES II —*Continued*						
1 tbsp. soda	68 cookies 2¼″ diam.	27.0	2949	170	949	1830
1 tsp. salt	1 cooky	0.4	43	3	14	26
MUFFINS, see *Bran, Cornmeal, Date, One-Egg, Twin Mountain, Whole Wheat*						
MUSHROOMS, BROILED, ON TOAST						
1 slice bread 3″ x 3½″ x ½″						
10 medium mushrooms 1½″ diam.						
1½ tbsp. butter	1 serving	3.7	304	28	167	109
MUSHROOM SOUP, CREAM OF						
2 cups milk						
2 tbsp. butter						
1 tbsp. flour						
¼ cup mushrooms	2½ cups	19.2	587	75	380	132
Seasonings	1 cup	7.7	235	30	152	53
MUSHROOMS, STEWED						
½ lb. mushrooms						
3 tbsp. butter						
1 tbsp. flour	2½ cups	10.0	440	32	333	75
1½ cups water	1 cup	4.0	176	13	133	30
NUT AND CHEESE ROAST						
1 cup grated cheese						
1 cup chopped walnuts						
1 cup dry bread crumbs						
2 tbsp. chopped onion						
1 tbsp. butter	Loaf 3″ x 4″ x 1¼″	14.8	1558	232	1060	266
2 tbsp. lemon juice						
Salt and pepper	Piece 1¼″ x 1¼″ x ¾″	0.9	100	15	68	17
NUT LOAF						
1 cup chopped walnuts						
2 eggs						
1 cup bread crumbs						
⅔ cup milk	2¾ cups	14.8	1020	164	632	224
Seasonings	1 cup	5.4	371	60	230	81

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
OATMEAL COOKIES						
1 egg						
¼ cup sugar						
½ cup skim milk						
½ cup oatmeal						
2 cups flour						
2 tbsp. crisco						
1 cup raisins						
½ cup peanuts						
2 tsp. baking powder	20 cookies 3″ diam.	18.7	2621	290	551	1780
1 tsp. salt	1 cooky	0.9	133	15	28	90
OATMEAL WAFERS						
1 cup oatmeal						
1 cup rolled oats						
2 cups flour						
¼ cup sugar						
1 tsp. salt						
⅛ tsp. soda						
¼ cup crisco	30 wafers 2¾″ diam.	15.0	2801	327	616	1858
½ cup hot water	1 wafer	0.5	100	11	23	66
ONE EGG MUFFINS						
2 cups flour						
4 tsp. baking powder						
½ tsp. salt						
2 tbsp. sugar						
1 cup milk						
2 tbsp. melted butter	10 muffins	16.6	1316	160	310	846
1 egg	1 muffin	1.7	132	16	31	85
ONIONS, SCALLOPED						
4 onions (10 oz.)						
1 cup milk						
2 tbsp. flour						
3 tbsp. butter						
¼ cup bread crumbs	2¾ cups	22.4	880	72	522	286
	1 cup	8.1	320	26	190	104
ORANGE CHIFFON PIE						
¾ tbsp. gelatin						
½ cup cold water						
4 eggs						
½ cup sugar						
½ cup orange juice						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
ORANGE CHIFFON PIE—*Continued*						
1 tbsp. lemon juice	Pie 9″ diam.	22.9	1730	104	502	1124
1 tsp. grated orange rind	Piece 4½″ at circum-					
Pastry for one crust	ference	3.6	280	15	82	183
ORANGE ICE						
¼ cup sugar						
⅓ cup orange juice						
½ tbsp. lemon juice	⅞ cup	7.8	244	—	—	244
½ cup water	1 cup	8.9	279	—	—	279
ORANGE JELLY WITH WHIPPED CREAM						
2 tsp. gelatin						
2 tbsp. cold water						
6 tbsp. boiling water						
6 tbsp. orange juice	1¼ cups jelly					
4 tbsp. lemon juice	with 2 tbsp. cream	10.9	400	25	111	264
4 tbsp. sugar	¼ cup jelly, 1					
2 tbsp. 40% cream	tsp. cream	2.2	80	5	22	53
ORANGE MILK SHERBET						
½ cup milk						
4 tbsp. orange juice						
1 tsp. lemon juice	⅞ cup	5.9	156	15	40	101
1 tbsp. sugar	1 cup	6.7	178	17	46	115
OYSTER STEW I						
1 cup (12) oysters						
2 soda crackers						
1½ tbsp. butter						
1 cup milk	2 cups	16.5	464	85	270	109
Seasonings	1 cup	8.3	232	43	135	54
OYSTER STEW II						
18 oysters						
1⅓ cups oyster liquor						
5 cups milk						
4 tbsp. butter	8 cups	64.0	1360	224	862	274
Seasonings	1 cup	8.0	170	28	108	34

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
PASTRY, PLAIN						
1¼ cups flour		10.2				
3 tbsp. lard	2 crusts 9″	un-				
3 tbsp. butter	diam.	cooked	1137	64	653	420
½ tsp. salt		8.5				
Water		cooked				
		2.8				
PEACHES, STEWED						
2 peaches						
2 tbsp. sugar	¾ cup	5.5	158	4	1	153
¼ cup water	1 cup	7.3	210	5	1	204
PEACH ICE CREAM						
6 peaches						
½ cup sugar						
1 cup thick cream	4 cups	30.2	1655	66	842	747
1 cup milk	1 cup	7.6	414	16	211	187
PEANUT BUTTER SANDWICH I						
2 slices whole wheat bread						
½ tbsp. peanut butter						
½ tbsp. raisins, chopped	1 sandwich 3″ x 3″	1.7	152	20	36	96
PEANUT BUTTER SANDWICH II						
2 slices whole wheat bread						
½ tsp. butter						
½ tbsp. thick cream						
½ tbsp. peanut butter						
½ tbsp. raisins	1 sandwich 3″ x 3″	2.5	250	20	135	95
PEANUT BUTTER SANDWICH III						
2 slices whole wheat bread 2½″ x 2½″ x ¼″						
1 tsp. butter						
1 tsp. peanut butter						
⅙ lettuce leaf	1 sandwich	1.3	131	15	66	50

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
Peanut Butter Soup						
1 cup milk						
1½ tbsp. peanut butter						
1½ tbsp. flour	1⅛ cups	9.8	370	68	200	102
Seasonings	1 cup	8.7	329	60	178	91
Peanut Cookies						
2 tbsp. butter						
¼ cup sugar						
1 egg						
¾ cup (scant) flour						
2 tbsp. milk						
½ cup chopped peanuts						
½ tsp. lemon juice						
1 tsp. baking powder	18 cookies 2″ diam.	9.3	1154	132	493	529
⅛ tsp. salt	1 cooky	0.5	57	6	25	26
Peas, Creamed						
¾ cup peas						
5 tbsp. white sauce	1 cup	6.2	222	39	83	100
Pea Soup, Cream of						
1½ cups peas						
1 cup milk						
1 cup water						
1 tbsp. flour						
1 tbsp. butter	3 cups	24.0	455	72	207	176
Seasonings	1 cup	8.0	152	24	69	59
Pea Soup, Split I						
½ cup split peas						
1 tbsp. flour						
1 cup water						
1 cup tomato juice	2½ cups	19.8	435	110	13	312
½ tsp. vegex	1 cup	7.9	175	44	5	126
Pea Soup, Split II						
½ cup split peas						
1 tsp. flour						
2 cups water	2½ cups	23.0	381	100	9	272
Seasonings	1 cup	9.0	152	40	3	109
Penuchi						
1 cup brown sugar						
¼ cup milk						
6 English walnuts	Sheet 3″ x 4¼″ x 1″	8.2	942	22	171	749
1 tsp. butter						
½ tsp. vanilla	Piece 1″ x 1″ x 1⅖″	0.9	100	2	18	80

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
PEPPERS, STUFFED I 6 large peppers 1 cup stale bread crumbs ⅔ cup brown sauce ¼ cup chopped mushrooms	6 peppers 1 pepper	25.4 4.2	484 80	70 12	83 14	330 54
PEPPERS, STUFFED II 6 large peppers 2 cups boiled rice ¾ cup tomato 1 tbsp. butter 1 onion 1 tsp. salt	6 peppers 1 pepper	36.5 7.0	521 100	57 11	110 21	354 68
PEPPERS, STUFFED III 6 large peppers 1½ cups bread crumbs 1½ cups chopped boiled ham Seasonings	6 peppers 1 pepper	33.9 5.7	1354 226	220 37	738 123	396 66
PERFECTION SALAD 2 tbsp. gelatin ½ cup cold water ½ cup mild vinegar 2 tbsp. lemon juice 2 cups boiling water ½ cup sugar 1 tsp. salt 1 cup finely shredded cabbage 2 cups celery (cut in small pieces) 2 pimentoes (cut in small pieces)	8 cups 1 cup	40.0 5.0	564 70	84 10	— —	480 60
PIES, see *Apple*, *Cranberry*, *Cream*, etc.						
PINEAPPLE AND CARROT SALAD 3 lettuce leaves 1 slice canned pineapple 2 tbsp. grated raw carrot ½ tbsp. mayonnaise						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
PINEAPPLE AND CARROT SALAD—*Continued*						
½ tbsp. 40% cream						
1 tbsp. pineapple juice	1 serving	5.6	200	5	71	124
PINEAPPLE MARSHMALLOW CUP						
2 cups pineapple cubes						
1 cup cut marshmallows						
¼ cup sugar						
¼ tbsp. cornstarch						
1⅞ tbsp. lemon juice	2½ cups	17.7	609	5	—	604
½ cup water	1 cup	7.1	244	2	—	242
PINEAPPLE SALAD						
1 slice canned pineapple						
1 tbsp. cheese						
2 lettuce leaves						
1 tbsp. mayonnaise						
1 tbsp. chopped nuts	1 serving	5.5	395	29	240	126
POPOVERS						
1 cup flour						
¼ tsp. salt						
⅞ cup milk						
2 eggs	7 popovers	15.0	706	128	188	390
½ tsp. melted butter	1 popover	2.0	100	18	27	55
POTATO SALAD						
1 large potato						
6 small lettuce leaves						
2½ tbsp. mayonnaise	2 servings	7.3	420	14	282	124
POTATO SOUP						
3 cups milk						
3 medium potatoes						
1 slice onion						
½ tbsp. butter						
1 tbsp. flour	4½ cups	36.0	852	126	324	402
Seasonings	1 cup	8.0	198	30	78	90

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbohydrate
POTATOES, CREAMED						
2 cups potato cubes						
2 tbsp. butter						
2 tbsp. flour						
1 cup milk	3⅙ cups	20.2	743	67	366	310
¼ tsp. salt	1 cup	6.4	235	21	116	98
POTATOES, MASHED						
5 medium potatoes						
3 tbsp. butter	3⅓ cups	21.8	690	50	330	310
⅓ cup milk	1 cup	6.5	207	15	99	93
POTATOES, SCALLOPED						
4 medium potatoes						
1 tbsp. flour						
½ tbsp. butter						
1 cup milk						
1 tsp. salt	4 cups	22.8	652	60	196	396
⅛ tsp. pepper	1 cup	5.7	163	15	49	99
POTATOES, SWEET, GLAZED	12 medium					
6 sweet potatoes	halves	34.3	1665	70	107	1488
¼ cup sugar	1 medium					
½ tbsp. butter	potato	5.8	278	12	18	248
POULTRY STUFFING						
2 cups soft bread crumbs						
2 tbsp. melted butter						
¼ cup milk						
Seasonings	1 cup	5.0	624	58	300	266
PRUNE AND COTTAGE CHEESE SALAD						
5 tsp. cottage cheese						
4 prunes						
⅓ tbsp. 40% cream						
3 lettuce leaves						
½ tbsp. mayonnaise	1 serving	4.7	200	21	83	96
PRUNE AND NUT SANDWICH						
2 slices whole wheat bread 3¾″ x 3″ x ¼″						
1 tsp. butter						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
PRUNE AND NUT SANDWICH—*Continued*						
1 tsp. chopped walnuts						
1 tbsp. prune pulp	1 sandwich	1.9	177	15	74	88
PRUNE PUDDING, NORWEGIAN						
½ lb. prunes						
1 cup sugar						
⅓ cup cornstarch	4 cups	35.0	1733	20	—	1713
1 tbsp. lemon juice	1 cup	8.7	433	5	—	428
PRUNE SOUFFLÉ						
⅓ lb. prunes (uncooked)						
5 egg whites	3⅓ cups	16.0	860	85	3	772
½ cup sugar	1 cup	4.8	258	25	1	232
PRUNES, STEWED						
1 lb. prunes	48 prunes and 4 cups juice	56.0	2068	32	—	2036
1 cup sugar						
Water	4 prunes and 4 tbsp. juice	5.6	200	4	—	196
RAISIN BREAD						
1⅔ lbs. flour						
1 cake yeast						
¼ cup sugar						
⅓ cup crisco	3 loaves 1 lb. each	48 0	4160	369	876	2915
1⅔ cups milk						
½ lb. raisins	1 slice 3¾″ x 3½″ x ½″	1.2	100	9	21	70
RAISIN AND CRANBERRY PIE						
1 cup cranberries						
1 cup raisins						
1 cup sugar						
1 tbsp. flour						
1 cup water	Pie 9″ diam.	25.0	2522	84	702	1736
Plain pastry for 2 crusts	Piece 4½″ at circumference	4.0	400	12	108	280
RAISIN PIE						
2 cups raisins						
2 tbsp. lemon juice						
½ cup sugar						
2 tbsp. cornstarch	Pie 9″ diam.	31.6	2738	96	791	1851
Plain pastry for 2 crusts	Piece 4½″ at circumference	5.4	450	13	120	317

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
RASPBERRY SHERBET						
1 qt. raspberries						
1¼ cups sugar						
1 cup water						
2 tbsp. lemon juice	3¼ cups	26.5	1256	14	1	1241
1 egg white	1 cup	8.2	386	4	—	382
RHUBARB PIE						
2¼ cups rhubarb						
1⅙ cups sugar						
1 egg						
2¼ tbsp. flour	Pie 9″ diam.	31.2	1802	92	326	1384
Plain pastry for 2 crusts	Piece 4½″ at circumference	4.8	280	14	50	216
RHUBARB, STEWED						
1 cup rhubarb (¾″ pieces)	2¼ cups	17.6	458	3	7	448
8½ tbsp. sugar	1 cup	7.8	203	1	3	199
RICE DAINTY						
½ cup rice						
½ cup heavy cream						
4 slices pineapple and	2½ cups	20.5	1096	44	396	656
4 tbsp. juice	1 cup	8.2	438	18	158	262
RICE FONDUE ON CRACKERS						
1 tbsp. raw rice						
4 tbsp. grated cheese						
½ tbsp. milk						
1 egg	4 crackers and 8 tbsp. sauce	4.4	321	72	153	96
4 saltines						
Seasonings	1 cracker and 2 tbsp. sauce	1.1	80	18	38	24
RICE PUDDING I						
½ cup boiled rice						
½ cup milk						
1 egg						
1 tbsp. sugar						
¼ tsp. lemon	1⅓ cups	8.2	260	45	85	130
extract	1 cup	6.2	195	34	64	97
RICE PUDDING II (CREAMY)						
2 cups milk						
¼ cup rice						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
RICE PUDDING II (CREAMY)—*Continued*						
⅙ cup sugar	1⅔ cups	14.1	646	79	175	392
⅛ tsp. salt	1 cup	8.5	387	47	105	235
RICE PUDDING III						
¾ cup rice						
30 raisins						
6 tbsp. sugar						
1 cup milk						
2 cups water	4 cups	18.0	1168	89	87	992
⅛ tsp. salt	1 cup	4.5	292	22	22	248
RICE WITH CHEESE						
¼ cup uncooked rice						
¼ cup cheese						
¾ cup milk	1¼ cups	8.1	496	82	170	244
⅛ tsp. salt	1 cup	6.5	397	66	136	195
RICE WITH CHEESE AND TOMATOES						
1 cup uncooked rice						
8 oz. American cheese						
1 pt. canned tomatoes	4¾ cups	37.5	1800	347	746	707
	1 cup	7.9	379	73	157	149
RUTABAGAS, BUTTERED						
1 cup rutabaga cubes						
1 tbsp. butter	1 cup	6.0	162	9	102	51
RUTABAGAS, CREAMED						
1 cup rutabaga cubes						
½ tbsp. butter						
½ tbsp. flour						
¼ cup milk						
Seasonings	1 cup	7.6	168	18	76	74
SALAD DRESSING, BOILED						
2 egg yolks						
½ tbsp. flour						
1½ tbsp. sugar						
1½ tbsp. melted butter						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
SALAD DRESSING, BOILED—*Continued*						
¾ cup milk						
¼ cup vinegar	1⅛ cups	13.0	462	47	292	123
Seasonings	1 tbsp.	0.8	30	3	19	8
SALAD DRESSING, FRENCH, see *French Salad Dressing*						
SALAD DRESSING, MAYONNAISE, see *Mayonnaise Dressing*						
SALAD DRESSING, MINERAL OIL						
1 egg yolk						
1 tsp. sugar						
1 tbsp. lemon juice						
1 tbsp. vinegar						
¾ cup mineral oil	1⅛ cups	8.8	66	9	41	16
Seasonings	1 cup	8.2	58	8	36	14
SALMON, CREAMED						
½ cup salmon						
1½ cups skim milk						
2 tbsp. oleomargarine	2 cups	16.0	552	114	278	160
3 tbsp. flour	1 cup	8.0	276	57	139	80
SALMON, CREAMED, WITH PEAS						
¼ cup salmon						
¼ cup peas						
¾ cup skim milk						
1 tbsp. oleomargarine						
1½ tbsp. flour						
2 slices toast	1¼ cups salmon and peas and toast	11.0	450	99	179	172
SALMON LOAF						
1 cup salmon						
½ cup bread crumbs						
1 egg						
1 tsp. butter	1½ cups	11.2	550	205	288	57
Seasonings	1 cup	7.5	367	137	192	38
SARDINE SALAD						
5 sardines						
2 egg yolks						
1 egg white						
2 leaves lettuce						
1 tsp. mayonnaise	1 large serving	3.5	310	85	195	30

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
SNOW PUDDING						
1 tbsp. gelatin						
1 cup sugar						
3 egg whites						
¼ cup lemon juice	6 cups	20.0	925	88	1	836
1¼ cups water	1 cup	3.3	154	15		139
SOY BEAN LOAF						
½ cup soy beans						
½ cup cheese						
1 pimento						
½ cup bread crumbs						
1½ tbsp. butter						
½ egg	1⅝ cups	11.5	960	223	520	217
½ tsp. salt	1 cup	7.1	591	137	320	134
SOY BEAN SOUP						
2½ cups milk						
¼ cup dried soy beans						
2 slices onion						
1 tbsp. butter	3¼ cups	24.4	703	142	405	156
½ tbsp. salt	1 cup	8.0	234	47	135	52
SPANISH CREAM						
1 tbsp. gelatin						
2 cups milk						
2 eggs						
½ cup sugar	4½ cups	23.0	930	139	260	531
½ tsp. vanilla	½ cup	2.5	100	15	28	57
SPINACH À LA CRÊME						
2 lbs. spinach						
2 tbsp. butter						
½ cup thick cream						
1 tsp. sugar	5½ cups	37.2	908	91	639	178
Seasonings	1 cup	6.8	165	17	116	32
SPINACH SOUP, CREAM OF						
4 cups milk						
2 tbsp. butter						
2½ tbsp. flour						
1 cup cooked spinach	5½ cups	42.0	985	153	554	278
Seasonings	1 cup	7.6	179	28	101	50

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
SPINACH WITH EGG 2 cups finely chopped spinach hard-boiled egg 1 tbsp. butter Seasonings	2 cups 1 cup	19.4 9.7	255 128	56 28	153 77	46 23
SPONGE CAKE 6 eggs 1 cup sugar 1 cup flour 1 tbsp. lemon juice ½ rind one lemon ¼ tsp. salt	Loaf 10″ x 4¾″ x 1½″ Piece 1½″ x 1½″ x 2″	16.0 0.9	1692 100	192 11	323 19	1177 70
SPONGE CAKE, HOT WATER 2 eggs 1 cup sugar 1 cup flour 1½ tsp. baking powder 2 tsp. lemon juice ⅜ cup hot water	Sheet 8½″ x 8½″ x ⅞″ Piece 2″ x 2¾″ x ⅞″	12.7 0.9	1355 100	98 7	95 7	1162 86
SQUASH PIE 1½ cups cooked squash 2 eggs ⅔ cup brown sugar 2 tbsp. molasses 1½ cups skim milk Plain pastry for undercrust	Pie 9″ diam. Piece 4½″ at circumference	25.0 4.1	1396 225	132 23	357 56	907 146
STUFFING, see *Poultry Stuffing*.						
SWISS CHARD SALAD ¾ cup shredded Swiss chard ½ tbsp. mayonnaise	1 serving	3.5	100	12	70	18
TAPIOCA-CORNMEAL PUDDING 5 tbsp. tapioca 4 tbsp. cornmeal 5 cups skim milk ⅓ cup molasses ⅓ cup sugar						

TABLE II.—DIETARY RECIPES (*Continued*)

INGREDIENTS	MEASURE	WEIGHT OUNCES	TOTAL CALORIES	DISTRIBUTION OF CALORIES		
				PROTEIN	FAT	CARBO-HYDRATE
TAPIOCA CORNMEAL PUDDING—*Continued*						
3 tbsp. butter	4¼ cups	29.6	1684	192	338	1154
½ tsp. salt	1 cup	6.8	396	45	79	272
TAPIOCA CREAM						
2 cups milk						
¼ cup sugar						
3 tbsp. tapioca						
1 egg	3 cups	22.0	766	91	219	456
½ tsp. vanilla	1 cup	7.3	255	30	73	152
TOAST, CREAM						
6 slices bread	6 slices toast and					
2 cups milk	2 cups sauce	21.0	958	124	413	421
3 tbsp. flour	1 slice toast and					
2 tbsp. butter	⅓ cup sauce	3.5	160	21	69	70
TOAST, FRENCH						
12 slices bread						
4 tbsp. butter	12 slices 3″ x					
1 egg	3″ x ½″	18.0	1248	132	588	528
1 cup milk	1 slice	1.4	100	10	48	42
TOMATO AND CUCUMBER SALAD						
6 slices cucumber						
3 slices tomato						
3 leaves lettuce						
1½ tbsp. mayonnaise	1 serving	3.7	185	8	149	28
TOMATO AND CUCUMBER SALAD WITH MINERAL OIL DRESSING						
10 slices cucumber						
1 small tomato						
2 lettuce leaves						
2 tbsp. mineral oil dressing	1 large serving	8.0	45	10	3	32
TOMATO AND LETTUCE SALAD						
4 medium tomatoes						
1 head lettuce	6 servings	32.0	1162	38	999	125
⅔ cup mayonnaise	1 serving	5.3	194	6	167	21

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
TOMATO AND LETTUCE SALAD WITH MINERAL OIL DRESSING						
1 small tomato						
2 leaves lettuce						
1 tbsp. mineral oil dressing	1 serving	5.5	30	7	2	21
TOMATOES, SCALLOPED						
1 cup tomatoes						
½ slice bread						
½ tsp. sugar						
½ tbsp. butter	1 cup	8.6	168	18	68	82
TOMATO JELLY SALAD						
1 can tomatoes (2 cups strained)						
1 tsp. salt						
1 tsp. sugar						
1 tbsp. gelatin						
½ cup cold water	2 cups	20.0	158	58	8	92
Dash cayenne	⅓ cup	3.3	25	9	1	15
TOMATO SALAD, STUFFED WITH TUNA FISH AND CELERY						
1 medium tomato						
⅛ cup tuna fish						
⅛ cup celery						
1 tsp. mayonnaise						
3 lettuce leaves	1 serving	7.0	100	25	50	25
TOMATO SAUCE						
1 cup tomato juice						
2 tbsp. flour						
2 tbsp. butter						
½ onion						
1 pepper corn						
Salt	1 cup	8.3	332	18	230	84
TOMATO SOUP, CLEAR						
2 cups tomato juice						
2 cups water						
2 tsp. sugar						
2 tbsp. butter						
3 tbsp. flour	4 cups	32.0	435	33	210	192
Soda and seasonings	1 cup	8.0	109	8	53	48

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbohydrate
TOMATO SOUP, CREAM OF						
2 cups canned tomatoes						
2 tsp. sugar						
1 qt. milk						
4 tbsp. flour						
⅓ cup butter						
⅙ medium onion	5½ cups	47.6	1480	165	927	388
Soda and seasonings	1 cup	8.7	269	30	169	70
TOMATO, STUFFED						
1 tomato						
1 tsp. butter						
¼ tsp. chopped onion						
2 tbsp. bread crumbs						
1 tsp. chopped ham	1 tomato holding ¼ cup	4.0	100	13	45	42
TOMATO STUFFED WITH LIVER						
1 tomato						
½ cup cooked liver						
1 tbsp. chopped onion						
1 tsp. butter						
Salt	1 stuffed tomato	5.9	167	68	73	26
TUNA FISH À LA NEWBURG						
2 cups tuna fish						
3 tbsp. butter						
1½ tbsp. flour						
1 tsp. lemon juice						
2 egg yolks						
½ cup skim milk	2 cups	16.0	893	318	538	37
Seasonings	1 cup	8.0	447	159	269	19
TURKISH PILAF						
½ cup raw rice						
1 tbsp. butter						
1 cup water						
1¾ cups canned tomato	5½ cups	41.8	557	52	121	384
Seasonings	1 cup	7.5	100	9	22	69

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbohydrate
TURNIP GREENS, CREAMED ¾ cup cooked turnip greens ½ tbsp. butter ¼ cup milk ½ tbsp. flour	¾ cup	5.8	130	19	74	37
Seasonings	1 cup	7.7	173	25	99	49
TURNIP GREENS WITH OIL ¾ cup turnip greens 1 tbsp. olive oil 1 tbsp. lemon juice	¾ cup	3.7	127	9	102	16
Seasonings	1 cup	4.9	169	12	136	21
TURNIPS, CREAMED 3 medium turnips ½ cup milk 1 tbsp. butter 1 tbsp. flour	1½ cups	8.6	292	29	147	116
Seasonings	1 cup	5.8	194	19	98	77
TWIN MOUNTAIN MUFFINS ¼ cup butter ¼ cup sugar 1 egg ¾ cup milk 2 cups flour 4 tsp. baking	10 muffins	14.8	1494	138	546	810
powder	1 muffin	1.5	150	14	54	82
VEAL CUTLETS 1⅛ lbs. veal (trimmed) 2 eggs 4 tbsp. butter 6 tbsp. flour 1 cup bread crumbs 3 cups water	6 servings	33.8	1697	512	875	310
Seasonings	1 serving	5.6	283	85	146	52
VEGETABLE SOUP ⅓ cup carrot ⅓ cup turnip ½ cup celery 1½ cups potato ½ onion 1 qt. meat stock						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories		
				Protein	Fat	Carbo-hydrate
VEGETABLE SOUP —*Continued*						
½ tbsp. parsley	3¼ cups	29.6	365	29	88	248
Seasonings	1 cup	9.1	112	9	27	76
WAFFLES						
2 cups flour						
2 tbsp. butter						
3 eggs						
1 tbsp. sugar						
1 cup milk	6 waffles 6″					
3 tsp. baking	diam.	13.6	1416	201	498	717
powder	1 waffle	2.3	250	35	88	127
WALDORF SALAD						
6 walnut halves						
½ medium apple						
¼ cup cut celery						
1 large leaf lettuce						
1½ tbsp. mayonnaise	1 large serving	3.3	258	11	195	52
WELSH RAREBIT						
¼ cup milk						
1 cup grated cheese						
1 egg						
2 tsp. butter						
4 slices toast	1 cup rarebit					
Seasonings	and toast	10.7	840	185	478	177
WHITE MOUNTAIN ICING						
1 cup sugar						
1 egg white						
½ cup water	1½ cups	8.7	853	12	1	840
WHITE SAUCE						
1 cup milk						
2 tbsp. flour						
2 tbsp. butter						
¼ tsp. salt	1 cup	10.0	416	38	286	92
WHOLE WHEAT MUFFINS						
1 cup whole wheat flour						
1 cup white flour						
¼ cup sugar						
1 cup milk						
1 egg						

TABLE II.—DIETARY RECIPES (*Continued*)

Ingredients	Measure	Weight Ounces	Total Calories	Distribution of Calories: Protein	Fat	Carbo-hydrate
WHOLE WHEAT MUFFINS—*Continued*						
1 tbsp. butter	10 muffins 2¾"					
1 tsp. salt	diam.	19.0	1463	180	260	1023
4 tsp. baking powder	1 muffin	1.9	146	18	26	102
WHOLE WHEAT MUFFINS WITH MOLASSES						
1¼ cups whole wheat flour						
1 cup white flour						
1 cup sour milk						
⅓ cup molasses						
¾ tsp. baking powder	10 muffins 2¾" diam.	18.7	1320	160	120	1040
1 tsp. salt	1 muffin	1.9	132	16	12	104

TABLE III

Fuel Values in Relation to Cost

A. Some Foods Costing ¾ Cent or Less per 100 Calories

Beans, dried
Butter (24 cents per pound)
Corn oil
Cottonseed oil
Cornmeal
Cornstarch
Corn syrup
Flour, whole wheat
  rye
  white
Hominy grits
Lard
Macaroni
Molasses
Oatmeal
Oats, rolled
Oleomargarine (24 cents per pound)
Peas, dried split
Rice (8 cents per pound)
Samp
Suet
Sugar

B. Some Foods Costing ¾ to 1 Cent per 100 Calories

Apple sauce cake
Bacon (all fat eaten)
Baking powder biscuit
Bread, Boston brown
  corn (old New England)
  white
Chocolate caramels
Coconut caramels
Cookies, plain
Cornflakes
Cornmeal muffins
Farina, white
Fudge, chocolate
Gingerbread
Griddle cakes
Hermits
Lentils
Lemon sauce
Molasses cookies
Oatmeal cookies
Oleomargarine (25 to 35 cents per pound)
One egg cake
One egg muffins
Peanut butter
Popovers
Pork, salt
Prunes
Raisins
Shredded wheat
Split pea soup
Sponge cake (hot water)
Tapioca, pearl
Wheat, flaked

C. Some Foods Costing 1 to 1½ Cents per 100 Calories

Apple pie
Apple sauce
Apple snow
Blanc mange, chocolate
  cornstarch
Butter (35 to 50 cents per pound)
Cake, angel
  chocolate
  sponge
Cheese straws
Chocolate (unsweetened)
Cocoa (powder)
Cookies, chocolate drop
Crackers, graham
  oyster
  soda
Cranberry pie
Cream puffs (shells)
Date pudding, steamed
Figs (unpressed)
French toast
Force
Grapenuts
Irish stew with dumplings
Lemon milk sherbet
Lemon meringue pie

C. Some Foods Costing 1 to 1½ Cents per 100 Calories (*Continued*)

Meat pie
Macaroni and cheese
Milk (7 to 13 cents per quart)
Milk, evaporated
Milk, condensed, sweetened
Muffins, whole wheat
Peanuts
Penuchi
Potatoes, creamed
  scalloped
  sweet
Prunes, stewed
Rice pudding, creamy
Rhubarb, stewed
Tapioca (granulated)
Waffles
Zwieback

D. Some Foods Costing 1½ to 2 Cents per 100 Calories

Apples, dried
Apple sauce, canned
Apricots, dried
Beef heart, stuffed
Butter (52 to 70 cents per pound)
Brown betty
Cheese, American
  cottage
Chocolate (sweet)
Cup custard
Eggs à la goldenrod
Filberts
Lemon ice
Lemon jelly
Lentil soup
Macaroni croquettes
Macaroni with tomato sauce
Marguerites
Mayonnaise dressing
Milk (10 to 13 cents per quart)
Olive oil
Peaches, dried
Pecans
Peanut butter soup
Peppers, stuffed with rice
Potatoes, Irish
Prunes
Prune soufflé
Rice with cheese and tomatoes
Salmon, creamed
Snow pudding
Spanish cream
Squash pie
Tapioca cream
Turkish pilaf

E. Some Foods Costing 2 to 2½ Cents per 100 Calories

Almonds
Baked bean soup
Bananas
Boiled custard
Boiled salad dressing
Brown sauce
Corn chowder
Corn, canned
Corn soup (cream of)
Cranberry jelly
Eggs (27 to 33 cents per dozen)
Lamb, shoulder
Lentil meat loaf
Lemonade
Milk (14 to 17 cents per quart)
Pineapple, canned
Potato soup
Saltines
Scalloped onions
String beans, canned
Stuffed steak
Swiss steak
Tomato soup (cream of)
Vanilla wafers

F. Some Foods Costing 2½ to 3 Cents per 100 Calories

Apples
Baked apples
Buttermilk
Dates
Dried beef, creamed
Egg lemonade
Flank steak
French dressing

F. Some Foods Costing 2½ to 3 Cents per 100 Calories (*Continued*)

Kidney bean stew
Milk (18 to 20 cents per quart)
Milk, powdered, skim
Milk, powdered, whole
Nut loaf
Nut and cheese roast
Rice pudding (with egg)
Spinach soup (cream of)
Tuna fish à la Newburg

G. Some Foods Costing 3 to 5 Cents per 100 Calories

Apricots, canned
Asparagus soup (cream of)
Banana salad
Beef, chuck (all fat eaten)
  round (all fat eaten)
Beef loaf
Beets
Cabbage
Cauliflower
Celery soup (cream of)
Cheese, cream
Cheese, Neufchâtel
Cheese soufflé
Cheese and pineapple salad
Club sandwich
Corn à la Southern
Cole slaw
Cream
Eggs (40 to 67 cents per dozen)
Egg timbale
Egg salad
Figs, pressed
Fruit salad
Grapefruit
Honey, strained
Lady fingers
Olives, green
Potato salad
Peas, canned
Pears, canned
Pork chops
Puffed corn
Puffed rice
Puffed wheat
Salmon (canned)
Salmon loaf
Sardines (canned)
Scrambled eggs
Tomato sauce
Turnips, fresh
Walnuts

H. Some Foods Costing over 5 Cents per 100 Calories

Asparagus
Beef, most cuts
Beef liver
Blackberries
Blue fish
Cantaloupe
Chicken, canned
  creamed
Carrots (young)
Celery
Cod, fresh
Dried beef
Grape juice
Halibut
Ham, boiled
Lamb chops
Lemons
Lettuce
Olives, ripe
Oranges
Peaches, canned
  fresh
Pears, fresh
Peppers, green
  green, stuffed with ham
Raspberries
Spinach
Tomatoes, canned
Tuna fish

TABLE IV

Table of Weight and Height for Men at Different Ages[1]

In ascertaining height, measure in shoes; stand erect, and press measuring rod down against scalp. Weigh yourself in indoor clothing and shoes. Subtract for height of heel, if measured in shoes.

Height	Age 19 Yrs.	20	21–22	23–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59
5 ft.	111	112	114	118	122	126	128	131	133	134	135
5 ft. 1 in.	116	117	118	121	124	128	130	133	135	136	137
5 ft. 2 in.	122	123	124	125	126	130	132	135	137	138	139
5 ft. 3 in.	127	128	128	129	131	133	135	138	140	141	142
5 ft. 4 in.	130	131	132	134	135	136	138	141	143	144	145
5 ft. 5 in.	134	135	136	137	138	140	142	145	147	148	149
5 ft. 6 in.	139	140	141	142	143	144	146	149	151	152	153
5 ft. 7 in.	142	143	144	145	146	148	150	153	155	156	158
5 ft. 8 in.	147	148	149	150	151	152	155	158	160	161	163
5 ft. 9 in.	152	153	154	155	156	158	160	163	165	166	168
5 ft. 10 in.	155	156	157	158	159	162	165	168	170	171	173
5 ft. 11 in.	159	160	161	162	164	166	170	174	176	177	178
6 ft.	163	164	165	166	168	172	176	180	182	183	184
6 ft. 1 in.	167	168	169	171	173	178	182	186	188	190	191
6 ft. 2 in.	171	172	174	176	179	184	189	193	195	197	198
6 ft. 3 in.	175	175	178	181	184	190	195	200	202	204	205
6 ft. 4 in.	178	180	183	186	189	196	201	206	209	211	212
6 ft. 5 in.	183	185	188	191	194	201	207	212	215	217	219

[1] From *Personal Health Standard and Scale*, by Thomas D. Wood, M.D., Bureau of Publications, Teachers College, Columbia University.

TABLE V

Table of Weight and Height for Women at Different Ages[1]

In ascertaining height, measure yourself in shoes; stand erect, and press measuring rod down against scalp. Weigh yourself in indoor clothing and shoes. Subtract for height of heel if measured in shoes.

Height	Age 19 Years	20	21–22	23–24	25–29	30–34	35–39	40–44	45–49	50–54
4 ft. 10 in.	104	106	108	110	113	116	119	123	126	129
4 ft. 11 in.	106	107	109	112	115	118	121	125	128	131
5 ft.	112	112	113	115	117	120	123	127	130	133
5 ft. 1 in.	116	116	116	118	119	122	125	129	132	135
5 ft. 2 in.	118	118	119	120	121	124	127	132	135	138
5 ft. 3 in.	120	121	122	123	124	127	130	135	138	141
5 ft. 4 in.	123	124	125	126	128	131	134	138	141	144
5 ft. 5 in.	126	127	128	129	131	134	138	142	145	148
5 ft. 6 in.	130	131	132	133	135	138	142	146	149	152
5 ft. 7 in.	135	135	135	137	139	142	146	150	153	156
5 ft. 8 in.	138	138	139	141	143	146	150	154	157	161
5 ft. 9 in.	142	142	142	145	147	150	154	158	161	165
5 ft. 10 in.	144	144	145	148	151	154	157	161	164	169
5 ft. 11 in.	146	147	149	151	154	157	160	164	168	173
6 ft.	150	152	154	156	158	161	163	167	171	176

[1] From *Personal Health Standard and Scale*, by Thomas D. Wood, M.D., Bureau of Publications, Teachers College, Columbia University.

TABLE VI

Weight-Height-Age Table for Boys of School Age[1]

Height (in.)	Av. Wt. for Ht. (lbs.)	5 Yrs.	6 Yrs.	7 Yrs.	8 Yrs.	9 Yrs.	10 Yrs.	11 Yrs.	12 Yrs.	13 Yrs.	14 Yrs.	15 Yrs.	16 Yrs.	17 Yrs.	18 Yrs.	19 Yrs.
38	34	34	34*													
39	35	35	35													
40	36	36	36*													
41	38	38	38	38*												
42	39	39	39	39*	39*											
43	41	41	41	41*	41*											
44	44	44	44	44	44*											
45	46	46	46	46	46*	46*										
46	48	47*	48	48	48	48*										
47	50	49*	50	50	50	50*	50*									
48	53		52	53	53	53	53*									
49	55		55	55	55	55	55	55*								
50	58		57*	58	58	58	58	58*	58*							
51	61			61	61	61	61	61	61*							
52	64			63	64	64	64	64	64	64*						
53	68			66*	67	67	67	67	68	68*						
54	71				70	70	70	70	71	71	72*					
55	74				72*	72	73	73	74	74	74*					
56	78				75*	76	77	77	77	78	78	80*				
57	82					79*	80	81	81	82	83	83*				
58	85					83*	84	84	85	85	86	87				
59	89						87	88	89	89	90	90	90			
60	94						91*	92	92	93	94	95	96			
61	99							95	96	97	99	100	103	106*		
62	104							100*	101	102	103	104	107	111	116*	
63	111							105*	106	107	108	110	113	118	123	127*
64	117								109	111	113	115	117	121	126	130*
65	123								114*	117	118	120	122	127	131	134
66	129									119	122	125	128	132	136	139
67	133									124*	128	130	134	136	139	142
68	139										134	134	137	141	143	147
69	144										137	139	143	146	149	152
70	147										143	144	145	148	151	155
71	152										148*	150	151	152	154	159
72	157											153	155	156	158	163
73	163											157*	160	162	164	167
74	169											160*	164	168	170	171

Age—Years		6	7	8	9	10	11	12	13	14	15	16	17	18	19
Average height (inches)	Short	43	45	47	49	51	53	54	56	58	60	62	64	65	65
	Medium	46	48	50	52	54	56	58	60	63	65	67	68	69	69
	Tall	49	51	53	55	57	59	61	64	67	70	72	72	73	73
Av. annual gain (lbs.)	Short	3	4	5	5	5	4	8	9	11	14	13	7	3	
	Medium	4	5	6	6	6	7	9	11	15	11	8	4	3	
	Tall	5	7	7	7	7	8	12	16	16	9	7	3	4	

*In order to extend the range of the tables so as to include weights of children who are taller or shorter than those in these groups there have been added as starred figures estimated weights. All the other weights represent averages for each inch in height and age of the children observed in this study.

[1] Prepared by Bird T. Baldwin, Ph.D., and Thomas D. Wood, M.D.

TABLE VII

Weight-Height-Age Table for Girls of School Age[1]

Height (in.)	Av. Wt. for Ht. (lbs.)	5 Yrs.	6 Yrs.	7 Yrs.	8 Yrs.	9 Yrs.	10 Yrs.	11 Yrs.	12 Yrs.	13 Yrs.	14 Yrs.	15 Yrs.	16 Yrs.	17 Yrs.	18 Yrs.
38	33	33	33												
39	34	34	34												
40	36	36	36	36*											
41	37	37	37	37*											
42	39	39	39	39*											
43	41	41	41	41	41*										
44	42	42	42	42	42*										
45	45	45	45	45	45	45*									
46	47	47*	47	47	48	48*									
47	50	49*	50	50	50	50	50*								
48	52		52	52	52	52	53*	53*							
49	55		54	54	55	55	56	56*							
50	58		56*	56	57	58	59	61	62*						
51	61			59	60	61	61	63	65						
52	64			63*	64	64	64	65	67						
53	68			66*	67	67	68	68	69	71*					
54	71				69	70	70	71	71	73*					
55	75				72*	74	74	74	75	77	78*				
56	79					76	78	78	79	81	83*				
57	84					80*	82	82	82	84	88	92*			
58	89						84	86	86	88	93	96*	101*		
59	95						87	90	90	92	96	100	103*	104*	
60	101						91*	95	95	97	101	105	108	109	111*
61	108							99	100	101	105	108	112	113	116
62	114							104*	105	106	109	113	115	117	118
63	118								110	110	112	116	117	119	120
64	121								114*	115	117	119	120	122	123
65	125								118*	120	121	122	123	125	126
66	129									124	124	125	128	129	130
67	133									128*	130	131	133	133	135
68	138									131*	133	135	136	138	138
69	142										135*	137*	138*	140*	142*
70	144										136*	138*	140*	142*	144*
71	145										138*	140*	142*	144*	145*

Age—Years		6	7	8	9	10	11	12	13	14	15	16	17	18
Average height (inches)	Short	43	45	47	49	50	52	54	57	59	60	61	61	61
	Medium	45	47	50	52	54	56	58	60	62	63	64	64	64
	Tall	47	50	53	55	57	59	62	64	66	66	67	67	67
Av. annual gain (lbs.)	Short	4	4	4	5	6	6	10	13	10	7	2	1	
	Medium	5	5	6	7	8	10	13	10	6	4	3	1	
	Tall	6	8	8	9	11	13	9	8	4	4	1	1	

*See footnote to Table VI.

[1] Prepared by Bird T. Baldwin, Ph.D., and Thomas D. Wood, M.D.

TABLE VIII

Weight-Height-Age Table for Boys from Birth to School Age[1]

Weight is stated to the nearest pound; height to the nearest inch; age to the nearest month.

Up to and including 34 inches the *weights are net*. Above this the following amounts have been added for clothing (shoes, coats, and sweaters are not included):

35 to 39 in. 1¼ pounds.
40 to 44 in. 1½ pounds.
45 to 49 in. 1¾ pounds.

Height (inches)	Average Weight for Height (pounds)	1 Mo.	3 Mos.	6 Mos.	9 Mos.	12 Mos.	18 Mos.	24 Mos.	30 Mos.	36 Mos.	48 Mos.	60 Mos.	72 Mos.
20	8	8											
21	9½	9	10										
22	10½	10	11										
23	12	11	12	13									
24	13½	12	13	14									
25	15	13	14	15	16								
26	16½		15	17	17	18							
27	18		16	18	18	19							
28	19½			19	19	20	20						
29	20½			20	21	21	21						
30	22			22	22	22	22	22					
31	23				23	23	23	23	24				
32	24½				24	24	24	25	25				
33	26					26	26	26	26	26			
34	27						27	27	27	27			
35	29½						29	29	29	29	29		
36	31							30	31	31	31		
37	32							32	32	32	32	32	
38	33½								33	33	33	34	
39	35								35	35	35	35	
40	36½									36	36	36	36
41	38										38	38	38
42	39½										39	39	39
43	41½										41	41	41
44	43½											43	43
45	45½											45	45
46	48												48
47	50												50
48	52½												52
49	55												55

[1] Prepared by Robert M. Woodbury, Ph.D.

TABLE IX

Weight-Height-Age Table for Girls from Birth to School Age[1]

Weight is stated to the nearest pound; height to the nearest inch; age to the nearest month.

Up to and including 34 inches the *weights are net*. Above this the following amounts have been added for clothing (shoes and sweaters are not included):

35 to 39 in. 1 pound.
40 to 44 in. 1½ pounds.
45 to 49 in. 1¾ pounds.

Height (inches)	Average Weight for Height (pounds)	1 Mo.	3 Mos.	6 Mos.	9 Mos.	12 Mos.	18 Mos.	24 Mos.	30 Mos.	36 Mos.	48 Mos.	60 Mos.	72 Mos.
20	8	8											
21	9	9	10										
22	10½	10	11										
23	12	11	12	13									
24	13½	12	13	14	14								
25	15	13	14	15	15								
26	16½		15	16	17	17							
27	17½		16	17	18	18							
28	19			19	19	19	19						
29	20			19	20	20	20						
30	21½			21	21	21	21	21					
31	22½				22	22	23	23	23				
32	24					23	24	24	24	25			
33	25						25	25	25	26			
34	26½						26	26	26	27			
35	29						29	29	29	29	29		
36	30							30	30	30	30	31	
37	31½							31	31	31	31	32	
38	32½								33	33	33	33	
39	34								34	34	34	34	34
40	35½									35	36	36	36
41	37½										37	37	37
42	39										39	39	39
43	41										40	41	41
44	42½											42	42
45	45												45
46	47½												47
47	50												50
48	52½												52

[1] Prepared by Robert M. Woodbury, Ph.D.

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